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Toxic Properties of Tuberculoproteins and Polysaccharides.—It has been shown that the polysaccharide isolated by Anderson from tubercle bacilli is toxic for guinea pigs. When death occurred there was a sudden fall in temperature, with a temporary fall in those animals surviving. Similar phenomena follow the administration of tuberculoprotein. Since the polysaccharide as prepared has a certain nitrogen content, and since all the protein preparations contain carbohydrates, one must resort to a biological titration in order to determine responsibility for the intoxication. By giving the polysaccharide and the protein to tuberculous animals in increasing doses, the authors have ascertained that the temperature reaction is due to the protein, since amounts of polysaccharide which do not contain as much nitrogen as is present in a temperature-altering dose of the protein fail to elicit the change. Most of the experiments with the protein were done with a preparation designated as *MA-100* (Mulford) which gives an active skin reaction in tuberculous guinea pigs in doses of 0.0001 mgm. Four preparations of tuberculopolysaccharides were used. The guinea pigs employed in the experiment each received 1 billion H37 human tubercle bacilli. The rabbits used received 0.5 mgm. of B1 bovine tubercle bacilli intravenously. The test material was usually inoculated intraperitoneally. All guinea pigs which received from 10 to 2.5 mgm. of the protein died within twenty-four hours, and all receiving less than 2.5 mgm. survived. Thus the minimal lethal dose for the protein lies between 2.5 and 10 mgm. in tuberculous guinea pigs. The polysaccharides were also found to have some killing power in sensitized guinea pigs, though this was by no means as consistently related to dosage as with the protein. The experiments with the polysaccharides suggest that these fractions of the tubercle bacillus have either a certain killing power in sensitized animals or may enhance the killing power of a dose of protein too small to kill by itself. The manner of death with the polysaccharides is exactly like that of the lethal action of the protein. In general, the animals which died after both protein and polysaccharide had extensive involvement of the liver, spleen, omentum and lymph nodes, and a moderate number of tubercles in the lung. They all showed congestion of the vessels of the lung but no oedema; most of them had haemorrhages around the tubercles in the lung and around the caseous areas in the omentum. The lymph nodes were congested. The animals which survived the injection of either protein or polysaccharide did not show any marked effects except on the temperature and on the blood cells. They were not clinically ill. The results were the same for both substances regardless of the route of injection. A typical temperature reaction involved a preliminary fall lasting from one-half to two hours, followed by a gradual rise of from 2° to 4.5°F., with a return to the original level in approximately five hours. After the injection of protein there was a

rise of leucocytes in nearly every guinea pig. In every animal there was a fall in lymphocytes, which for the most part showed little or no tendency to recover. The monocytes also fell in every instance, but showed a tendency toward a subsequent rise before the end of the seven hours of the experiment. The average fall in lymphocytes in tuberculous guinea pigs after the protein, computing from the percentages rather than the total numbers, was 63 per cent. After the injection of the polysaccharides the total numbers of lymphocytes fell in every instance but one. The average fall was 45 per cent. Six normal guinea pigs showed a fall in lymphocytes of 35 per cent in seven hours after tuberculoprotein, and 8 showed a fall of 65 per cent after tuberculopolysaccharide. Since the reaction of the temperature and of the blood cells to these two substances was the same and since each was contaminated with the other, it was necessary to see if one substance could give the reaction in such small doses as to exclude the other. In all the experiments done there was probably enough protein, or its degradation products, to account for the temperature reaction with the polysaccharides, provided the protein was in an active form. It has long been known that the injection of proteins causes fever and a leucocytosis. Salts and sugars also have a constant effect on the blood when injected. There is an immediate leucopoenia, followed by a leucocytosis in which the three strains of circulating white cells fall at different rates and return at different times. The leucocytes start to return first; then the monocytes and finally the lymphocytes. This reaction is elicited in the tuberculous animal by all the proteins tested; it also follows the injection of polysaccharide in concentrations containing an amount of nitrogen too small to cause a temperature reaction. The rise in leucocytes in tuberculous animals is not consistently greater than is recorded in the literature (for normals?). The fall in lymphocytes of 63 per cent corresponds with the 70 per cent for all mononuclear cells recorded by Hussey. The question suggests itself of whether the tuberculoprotein and the polysaccharides may not affect the proportion of monocytes to lymphocytes, and so be concerned with the cellular factors of resistance to infection.—*A Study of the Toxic Properties of Tuberculo-Proteins and Polysaccharides, F. R. Sabin, F. R. Miller, C. A. Doan and B. K. Wiseman, J. Exper. Med., January 1, 1931, liii, 51.*—(*J. S. W.*)

Modern Conception of Early Phthisis.—An acute infiltration of the lung, developing usually in the infraclavicular region, is the modern conception of early tuberculosis. This initial infiltration, which is represented by a small area of bronchopneumonia, surrounded by perifocal inflammation, may occasionally heal with or without treatment. Generally, if left without treatment, it spreads by one or more of the following ways: *1:* The initial infiltration spreads by small aspiration bronchopneumonic areas that form around the initial lesion. *2:* Coincident with the aspiration spread, or occasionally before an aspiration spread has formed, the initial infiltration may undergo caseation, and cavity-formation take place. *3:* While the initial infiltration still appears to be intact, there may appear in another part of the lung, or the other lung, a second infiltration, the so called "daughter infiltration," which is probably an aspiration spread. The daughter infiltration may follow a course similar to that of the initial infiltration. If the aspiration process goes on increasing and unchecked, the condition becomes one of acute phthisis. If, however, the disease process is slowed down, a certain amount of fibrosis takes place; cavities already developed become thick-walled, the aspiration spreads show tendency to fibrotic changes, and the picture develops into one of chronic phthisis. The clinical aspect is that of a short, acute, febrile attack with indefinite symptoms. It is frequently diagnosed as "influenza." By the time the disease is diagnosed, the initial infiltration has broken down to form a cavity, with or without an accompanying aspiration spread. The constitutional changes, such as loss of weight, lassitude, anorexia, night-sweats, which have long been regarded as the earliest manifestations, are in reality quite late symptoms. A large percentage of patients with initial infiltration have been in contact with an open case. Radiology plays an important part in the diagnosis of the initial infiltration, but it is not the deciding factor, for the skiagram of this lesion may bear a close resemblance to a small pneumonic area, a pulmonary abscess, a new growth, or a gumma. It is only by taking into account the clinical history, the physical signs or the absence of physical signs, the pathological examination of the sputum, and, sometimes, of the blood for leucocytosis or Wassermann reaction, that the X-ray picture can be correctly interpreted. There is no doubt that a certain number of these initial infiltrations will heal and become fibrotic if the patient is given general sanatorium treatment only. However, artificial pneumothorax is the best form of therapy. Because of the success of early artificial pneumothorax it is imperative to diagnose intact

initial infiltration before cavitation or spread has taken place.—*The Modern Conception of Early Phthisis, H. V. Morlock, Brit. M. J., April 25, 1931, no. 3668, 702.*—(*M. E. P.*)

Assessment of Cases of Pulmonary Tuberculosis.—One hundred patients with pulmonary tuberculosis were investigated and assessed according to clinical phaenomenon, X-ray studies and blood-pictures. Ninety-four of these were followed up one year later and reported as being dead, worse, stationary, or better. Marks up to a fixed maximum for each series of observations were assigned to each patient. The systemic estimate, based on temperature, weight and general characters, was more successful than the X-ray, based on extent, density, and general characters of the lesions. The assessment on blood changes was based on the sedimentation test, Von Bonsdorff counts, and lymphocyte-monocyte ratio. In the case of the sedimentation test and the Von Bonsdorff counts, the marks allotted were, for the most part, high, and a fair number of those cases noted as "very bad," by these tests, tended to improve or to remain stationary, although the majority died within a year. The few patients receiving low marks tended to improve or to remain stationary. In determining the lymphocyte-monocyte ratio, it was found that a high number of monocytes gave a grave prognosis. High leucocyte counts and high neutrophile counts also indicated severe pulmonary tuberculosis. It would seem that a careful clinical assessment is more likely to be successful than one made on blood examinations alone, but a combined clinical and haemotological study is more reliable than either one separately. A combined systemic and Von Bonsdorff assessment approaches nearer to an accurate forecast than any of the other assessments.—*Investigation and Assessment of One Hundred Cases of Pulmonary Tuberculosis, S. L. Cummins and S. B. H. Walker, Tubercle, June, 1931, xii, 385.*—(*M. E. P.*)

Appraisal of Pulmonary Tuberculosis.—In the assessment of patients with a view to the evaluation of treatment, a close study of clinical types on definite and agreed lines is necessary. Inman's classification which depends upon thermometric records; X-ray photographs, taken on standard lines, according to an agreed technique; the temperature curve; an evaluation of the weight changes in the patient; and such measurable phenomena as the pulse rate and amount of sputum, are all factors to be considered in a clinical assessment. In addition, the changes in the blood are taken into consideration. The blood sedimentation test, Von Bonsdorff's modification of Arneth's Index, and the monocyte count are also used. The author describes a system of marking according to the amount of change observed, expressing the differences between patients numerically in terms of the aggregate marks allotted to them out of a possible one hundred. It is the author's opinion that, while a very fair approach to a satisfactory assessment of cases is possible on "clinical grounds" alone, the inclusion of blood tests makes the evaluation more accurate.—*The Assessment of Cases of Pulmonary Tuberculosis, S. L. Cummins, Tubercle, January, 1931, xii, 155.*—(*M. E. P.*)

Diagnosis of Preclinical Tubercle.—Serology is of value in (1) cases whose clinical picture resembles tuberculosis, (2) contact cases, (3) active tuberculosis, and (4) arrested or apparently cured tuberculosis. The tuberculocomplement-fixation test and Caulfeild's inhibitive reaction were done 25,000 times in 5,000 cases. Successive fixation and inhibitive reactions frequently vary in the same case of tuberculosis. The variations in the inhibitive reaction should be accepted as indicating varying immunity. The tests are properly employed only in series. They are of primary value and are easier of interpretation for diagnosis in dealing with suspects or contacts and are of secondary value and are more difficult of interpretation in prognosis for arrested cases or in considering radical measures such as pneumothorax and thoracoplasty. Interpretation of the reactions is described in detail. In several hundred closely watched adults demonstrable tuberculosis was not found earlier than fifteen months after exposure. The incubation period in the author's series varies from one to five or seven years. Macintyre has shown that 95 per cent of the tests were positive in definite cases of surgical tuberculosis. Ten cases of suspected tuberculosis are reported. At first examination of these patients no positive diagnosis was made by examination of sputum or discharges or by stereoscopic roentgenograms. Of the 10 cases 8 gave serological reactions indicating the presence of tubercle. Of these 8 cases, 4 later had tubercle bacilli in their sputum, 3 had definite pulmonary lesions demonstrated by roentgenograms, and in one a caseous tuberculous lesion was found at necropsy. The remaining 2 patients gave repeated negative serological reactions. In both a satisfactory diagnosis other than that of tubercle was finally made. These tests in the adult are comparable in value to intracutaneous tuberculin tests as diagnostic in infants.—*The*

Diagnosis of Pre-Clinical or Latent (Biological) Tubercle in Suspects and Contacts by Caulfeild's Inhibitive and the T. C. F. Reactions; Clinical Application, W. E. Ogden, Ann. Int. Med., October, 1930, iv, 379.—(R. M. F.)

Diagnosis of Preclinical Tubercle.—The value of Caulfeild's inhibitive and the tuberculosis complement fixation in studying contact cases is discussed and illustrated by 10 case histories. Contact cases are those which have associated with tuberculosis patients, that is, have spent more than a dozen hours in the same unventilated room, with the disease present and the patient untrained. An estimate of the amount of exposure is important. That to which the average city-dweller is subject may be termed minimal, that present when the case of tuberculosis works at the same desk or bench or eats at the same table is gross, that of a room-mate, consort, or fiancè is massive. The public should be more "contact conscious." In the group of 10 cases presented, only 4 came on their own initiative. The histories given show that positive serological tests were often the first positive intimation of active disease. The shortest incubation period was fifteen months, the longest six years. In discussing observations of 200 contacts in private practice, the following groups are described: (1) the largest group, those who gave positive tests for two years or more and did not develop lesions; (2) the second largest group, those with negative tests and no lesions; (3) contacts not seen until two to four years after exposure, when positive tests and X-ray evidence of lesions were found; and (4) those who developed lesions while under observation, always anticipated by positive tests. It is felt that contacts should be kept under observation for a longer period than has heretofore been considered necessary and that these serological tests are of value during this time. A graphic form for recording the tests is described and illustrated.—*The Diagnosis of Pre-Clinical Tubercle in Suspects and Contacts by Caulfeild's Inhibitive and the T. C. F. Part II: Clinical Application, W. E. Ogden, Ann. Int. Med., June, 1931, iv, 1551.—(R. D.)*

Psychology of Tuberculosis.—Three questions are discussed. *1: Does tuberculosis produce any marked mental change in the patient?* The disease attacks persons of all types and brings with it worries and difficulties which cause a very real stress. The reactions of those suffering from the disease are largely due to the strain imposed and are not necessarily a reflection of the toxaemia of the disease. The response to the disease is usually conditioned by the patient's personality and interests, and to a degree by his economic situation. *2: Does the mental attitude of the patient have any effect on the course of the disease?* It has a great effect. One who feels that he still has something to live for will make better progress than one who is depressed and worried by his condition. *3: What can be done to obtain the maximum alleviation of the disease?* During treatment every effort should be made to give the patient a new outlook on life. After the sanatorium stay those with means may do well at home. Those who must go home to the old environment and face a financial struggle all too often break down. Their families are likewise faced with an economic burden and exposure to infection, and new cases of disease may result. An arrested case that is able to live in a proper environment may enjoy a self-respecting life, and under medical supervision is enabled to do suitable work. Freedom from anxieties and worries makes life worth living and the facts are that the expectation of life is increased.—*A Psychological View of the Tuberculosis Problem. H. Banister, Brit. J. Tuberc., April, 1931, xxv, 62.—(R. D.)*

Eosinophilia in Tuberculosis.—The occurrence of eosinophilia in tuberculosis does not necessarily indicate healing. It is the expression of a condition of hypersensitiveness. During these phases the formation of new foci, exacerbation of old foci and liquefaction occur frequently. All these processes may or may not be followed by healing or progression. Eosinophilia is an important indicator in tuberculin therapy.—*Die Rolle der Eosinophilie im Tuberkulösen geschehen, H. Grass and H. U. Simmert, Klin. Wchnschr., August 1, 1931, x, 1456.—(M. P.)*

Lateral Tracheal Displacement.—A laryngeal examination which reveals lateral displacement of the tracheal rings is an indication of intrathoracic disease, unless it is caused by obvious tumors of the lower cervical region or deformity of the chest. The fibrosis associated with pulmonary tuberculosis is the most common cause. Other possible lesions are atelectasis of the lung, pleural effusion, and mediastinal neoplasm. Patients with unrecognized pulmonary tuberculosis may consult a laryngologist on account of alterations in the voice. Slight changes in the appearance of the larynx which lack diagnostic significance may be present, but a lateral displacement of the trachea may be observed. This find-

ing will call for a thorough examination of the chest. Two cases are cited in which X-rays of the chest led to a diagnosis of pulmonary tuberculosis.—*Lateral Tracheal Displacement, J. E. G. McGibbon, Lancet, June 27, 1931, ccxx, 1399.*—(*R. D.*)

X-Ray Diagnosis of Haematogenous Pulmonary Tuberculosis.—The roentgenological picture of acute generalized miliary tuberculosis is well known. Certain deviations from the typical appearance should be considered. The size of the single foci may not be uniform throughout. Incipient lesions can frequently be recognized roentgenologically before clinical signs are detectable. The roentgenological picture of miliary tuberculosis can be simulated by chronic pulmonary congestion, especially in mitral stenosis, by lymphangitis carcinomatosa, by disseminated bronchopneumonia and by bronchitis obliterans. The term, *haematogenous propagation*, is not synonymous with miliary tuberculosis, since localized haematogenous spread is frequently observed. There is, for example, a group of apical lesions whose chief characteristic is the localization at the apical pleura with small parenchymal shadows in the apical field. If these lesions are well fibrosed they are clinically insignificant. In the active stage, called *tuberculosis miliaris discreta*, the apical fields show thin cloud-like shadows, which slowly undergo resorption and fibrosis, leaving finally sharply-defined small shadows, the roentgenological manifestations of productive fibrotic tubercles. The same type of lesions, but more extensive in size and number, is called *tuberculosis fibrosa densa*. Such foci may undergo excavation, producing apical cavities and the clinical picture of *phthisis ulcerofibrosa*. All these lesions show a tendency to symmetrical arrangement. It is not always possible to arrive at a clear-cut diagnosis. In many patients combinations of haematogenous and bronchogenic propagations cloud the picture.—*Die Röntgendiagnose der auf dem Blutwege entstandenen Lungentuberkulose, F. Fleischner, Wien. klin. Wchnschr., May 22, 1931, xliv, 678.*—(*M. P.*)

Stereoscopy of X-Ray Shadows.—Optical mechanisms involved in the appreciation of solidity in stereoscopy are outlined. There are two chief ways in which to appreciate solidity: (1) "perspective solidity," which is almost wholly a matter of visuo-associative memory, and involves primarily a mental process; and (2) "convergence solidity," which is amost wholly a matter of physical process. If a stereoscopic photograph be viewed through a stereoscope by one eye, perspective solidity is obtained. With both eyes in use convergence solidity is superadded and the feebleness of perspective solidity is at once manifest. The stereoscope is an instrument for bringing into play fluctuations of the axial intersecting angle and so reproducing the variations of muscle balance normally associated with solid vision. Only one shadow can be in accurate focus at one time, and to bring the remaining shadows into focus necessitates fluctuations of muscular balance which, depending on whether the fluctuation is one of divergence or convergence, are interpreted as representing either a movement of recession or approach.—*The Stereoscopy of X-ray Shadows, L. B. Stott and D. B. Cruickshank, Tubercle, April, 1931, xii, 289.*—(*M. E. P.*)

Thoracoscopic Technique.—The use of a single instrument for thoracoscopy and cutting of adhesions is recommended. The suggestion is made that diathermy is useful in dealing with large adhesions, but that the electrocautery be relied upon for cutting string adhesions. A minute electrocautery and its method of use are described.—*Thoracoscopic Technique Influenced by Type and Position of Adhesions, F. G. Chandler, Lancet, May 2, 1931, ccxx, 971.*—(*R. D.*)

Roentgenology of Interlobar and Mediastinal Effusions.—It is obvious that the X-ray shadow cast by effusion in the interlobar fissure will vary in its position and appearance, depending upon the portion of the fissure that is involved. Likewise, the shadow depends upon the amount of the fluid and the compressibility of the adjacent tissues. In such effusions the diaphragm is in normal position and it moves freely. Frequently there is a narrow band of air-containing lung between the effusion and the mediastinum. Fluoroscopy and lateral films are essential if the patient is not too ill. If air gets into the interlobar space, the shadow of the effusion is frequently like that of an abscess. Pneumonia may also resemble interlobar effusion in the film as may encapsulated hydropneumothorax, differentiation from the latter being impossible in some instances. Bronchial carcinomata may also be mistaken for effusions. When interlobar effusion complicates pneumonia, bulging of the fissure seen in lateral view aids materially in the roentgenological diagnosis. Mediastinal effusions are confined to the pleural surfaces in the mediastinal region and do not directly affect the mediastinal structures. Most of the serous mediastinal effusions are tuberculous in nature; most of the purulent ones are of pneumococcal

origin. They may be anterior or posterior and right or left. Anterior effusions appear in the film as ribbon-like shadows parallel to the cardiac silhouette to which they give a double contour. Posterior effusions tend to parallel the vertebral column or to be triangular, with the base at the diaphragm and their apex toward the hilum. Such effusions are sometimes confused with pericardial effusions, but they do not pulsate. They sometimes resemble bronchiectatic shadows and lipiodol may be injected as a differentiating manoeuvre. They must be differentiated at times from aneurysm, mediastinal tumor or paravertebral abscess. —*Roentgenological Appearance of Interlobar and Mediastinal Encapsulated Effusion in the Thorax, E. Freedman, Radiology, January, 1931, xvi, 14.*—(*H. S. W.*)

Intravenous Pyelography.—Abrodil, sodium-mono-iodo-methane sulphonate, was used for intravenous pyelography, as the shadows produced were denser and better defined than those given by uroselectan. Observations in a series of urograms show the following: *1:* A normal pyelogram has never appeared on the diseased side. The intensity of the shadow is less dense than on the normal side and may show an overlarge pelvis with calyces varying from normal to ragged or dilated forms. The normal side has always showed a normal pyelogram in at least one of the exposures made. *2:* The ureter tends to be uniformly patent throughout its entire length, not presenting the broken column with the absent middle two-fourths seen in the normal state. *3:* Loss of the curved outline of the bladder near the ureteral orifice on the diseased side has not been noted. Whether the absence of deformity of the urogram will prove to be consistent enough to permit the exclusion of tuberculous disease remains to be seen. If it should do so the method will be of value, especially in those cases in which cystoscopy is difficult and ureteral catheterization impossible owing to an advanced degree of cystitis.—*Intravenous Pyelography in Urinary Tuberculosis, J. Everidge, Brit. J. Tuberc., April, 1931, xxv, 59.*—(*R. D.*)

Intracutaneous Tuberculin Test.—The Mantoux test was performed for a time on all children admitted to the East London Children's Hospital, in order to make a comparison of the results obtained in the slum district served by this hospital with those observed in America and elsewhere, 0.1 cc. of 1:1000 Old Tuberculin being given intracutaneously. Both human and bovine tuberculins were used in the first 50 cases, until it became apparent that there was no difference in the reaction to the two types. Readings were taken after twenty-four to forty-eight hours in all cases, and in cases yielding positive reactions observations were carried out every other day subsequently until discharge. Three times after bovine and five times after human tuberculin had been injected, transitory areas of erythema were observed for six to twenty-four hours around the site of injection. These cases gave no evidence clinically of past or present infection with any form of tuberculosis. In 6 cases the appearance of the skin reaction was delayed for varying times up to eight days. The figures obtained from the 400 unselected cases grouped together are as follows: Positive, 86 (21.5 per cent); negative, 314 (78.5 per cent); number of cases confirmed, 31 (23 antemortem, and 8 postmortem). In a selected group of 100 cases the test was performed purely as a diagnostic aid, and only those cases suspected of tuberculosis or in which it was particularly important to exclude tuberculosis as the cause of symptoms were included. The results showed 38 per cent positive and 62 per cent negative. *Conclusion: 1:* The Mantoux test is extremely valuable in children. It is easy to perform and is quite painless to the average child. *2:* Care being taken to exclude sources of error, a negative result excludes tuberculous infection and is a comforting finding in debilitated children after measles, whooping-cough, and bronchopneumonia, and in cases of chronic cervical lymphadenitis and so called "intestinal indigestion." *3:* A strongly positive result in young children suggests active tuberculous disease and usually justifies a bad prognosis. *4:* A mildly positive result indicates tuberculous infection (not necessarily disease), and children showing such a reaction would benefit from open air treatment and increased prophylactic precaution.—*The Mantoux Test. An Analysis of 500 Cases, W. F. Gaisford, Lancet, March 7, 1931, ccxx, 521.*—(*F. G. P.*)

Tubercle Bacilli in Gastric Lavage in Children.—In children who have vague symptoms and give positive tuberculin reactions in the absence of conclusive evidence of pulmonary tuberculosis in the physical and roentgenological examinations, it is necessary to demonstrate tubercle bacilli in the sputum in order to establish a diagnosis and institute treatment before the process becomes extensive. This can frequently be accomplished by microscopic examination of the material obtained by gastric lavage, cultivation on Petroff's medium and inoculation into guinea pigs. This procedure is of great importance, especially in children

under 3 years of age. In 62 suspects in this age-group bacilli were found in 41 cases. In 48 cases over three years bacilli were demonstrated in twelve. Unless bacilli are demonstrated in the first lavage, the examination should be repeated twice, and in strongly suspected cases three or more times. The nature and expense of the procedure warrants its omission in cases of obvious pulmonary tuberculosis or of tuberculous meningitis. The test would appear to be important in determining the presence of active pulmonary tuberculosis in cases of surgical tuberculosis (bone, joint and kidneys).—*Pulmonary Tuberculosis in Children: Demonstration of Tubercle Bacilli in Gastric Lavage, V. Poulsen, Am. J. Dis. Child., April, 1931, xli, 783.*—(*M. D.*)

Red-Cell Sedimentation Test.—A study of the sedimentation test in 2,000 patients is reported. Exactly controlled standardized technique and repetition of the test at intervals are essential features of the procedure. Presentation of readings in graphic form and their comparison with minimal normal graphs renders possible an easy visualization of the results. It proved highly practical to record the readings in one figure which represents the percentage of the minimal normal rate. The test cannot be used in the diagnosis of tuberculosis unless pathological conditions causing a similar increase in the sedimentation rate can be excluded. Of the patients having manifest active tuberculosis, 7.35 per cent showed normal sedimentation curves. This group included 14 cases of minimal, 54 of moderately advanced and 13 of far-advanced pulmonary and 47 of extrapulmonary tuberculosis. If this working error is discounted, the test gives valuable information concerning the activity of the disease, the amount of tissue destruction and the toxicity of the process. Retarding of the sedimentation speed in a patient in whom it was originally very rapid may be interpreted as a sign of improvement. A constantly increased rate indicates the spread of the disease or the onset of some complication. The test cannot be used for estimating the extent of the lesion. A limited process with marked tissue disintegration and characteristic toxic symptoms will cause a more rapid sedimentation rate than an extensive fibrotic lesion with slight toxicity. A rapid rate found on repeated examinations means an unfavorable prognosis. The greatest merit of the test lies in its value as an index of changes in the general and local condition of the patient. It should be used as a guide for prescribing and controlling routine or special treatment of the tuberculous. It may serve as a valuable aid in connection with the physical examination for determining the patient's working capacity before discharge from the sanatorium and at each examination at the dispensary.—*Erythrocyte Sedimentation Test in Tuberculosis, A. L. Banyai and S. V. Anderson, Arch. Int. Med., November, 1930, xlvi, 787.*—(*W. I. W.*)

Complement Fixation in Tuberculosis.—The fact that many tubercle bacillus antigens react with Wasserman-positive sera is probably due to a common lipoidal fraction in tuberculosis and syphilitic antigens. This factor is alcohol-soluble. In order to render antigens more specific it was deemed necessary to exclude this factor from the antigen. When dried tubercle bacilli are extracted with boiling alcohol a certain part of the alcohol-soluble substances precipitate on cooling. This latter fraction is a more specific antigen than the complete alcohol-soluble substance. The antigen which is recommended is prepared by extracting tubercle bacilli with hot alcohol and by extracting the parts which precipitate on cooling with pyridine. The residue of the pyridine extraction is purified with acetone and finally dissolved in benzol. For the final use the benzol solution is evaporated and the residue is suspended in physiological salt solution with the addition of some lecithin to increase the sensitiveness of the antigen. This antigen gives many less positive reactions with Wasserman positive sera and is quite sensitive in regard to tuberculosis sera. However, cross-fixations are observed with sera from leprosy patients and occasionally with diphtheria sera. The results obtained with this antigen are described as satisfactory without mentioning any figures.—*Serodiagnostische Untersuchungen bei Tuberkulose, E. Witebsky, R. Klingenstein and H. Kuhn, Klin Wchnschr., June 6, 1931, x, 1068.*—(*M. P.*)

X-Ray Treatment of Tuberculosis of Eye.—Tuberculin is often a very salutary agent in the treatment of tuberculosis of the eye. But, unfortunately, it does not cure all cases. Of more than 2,000 cases treated since 1925, 50 refractory ones have been under observation for two years subsequent to the use of X-ray as an additional therapeutic measure. It is this which the report concerns. No uniform dose and no standard, unvarying technique have been established, because of the marked individual differences in the manifestation of the disease which may be local only, but which is usually more or less general. Different tuberculous eyes differ greatly in responsiveness to con-

stant doses of X-ray. Whether different doses are indicated in people with different degrees of allergy or with anergy, or whether the degree of hypersensitiveness of the skin is paralleled by the eye in the same individual remains to be answered. It is clear that, although occasionally a diseased eye does badly very promptly after roentgenological treatment, many of the cases were improved and some were cured by this treatment. Of these 50 cases, chronic iridocyclitis (uveitis) (20 cases), choroiditis (10 cases) and scleritis and sclerosing keratitis (8 cases) predominated. There were a few cases of acute iritis, keratitis and recurrent vitreous haemorrhage. All of the cases (6) of acute tuberculous iritis were favorably influenced. Three of 20 cases of iridocyclitis improved. Chronic choroiditis was uninfluenced; acute choroiditis was greatly benefited. In one instance of bilateral acute choroidoretinitis, the one eye which was treated with X-ray while tuberculin therapy was being carried out experienced restoration months before the other. The results in the cases of keratitis "were very good." The mechanism of X-ray therapy in the eye is not understood although several ideas are held concerning it.—*The Treatment of Ocular Tuberculosis by Means of X-rays, J. Urbanek, Brit. J. Actinother. & Physiother., November, 1930, v, 169.*—(*H. S. W.*)

Tuberculous Laryngitis.—Tuberculous laryngitis is one of the most serious and most frequent complications of pulmonary tuberculosis. Five groups of lesions are observed: (1) slight early infiltration, generally showing some congestion and swelling of the arytenoids or the interarytenoid fold, without or maybe with only slight dysphagia; (2) intrinsic lesions, showing infiltration and sometimes ulceration of the cords without much pain; (3) extrinsic cases, showing oedema of the arytenoids often extending to the epiglottis, generally accompanied by much dysphagia; (4) extensive oedema, involving the epiglottis, ventricular folds and arytenoids, with ulceration of the cords; and (5) tumor-like growths. Absolute silence is indicated in all except hopeless cases. Therapy consists of (1) local applications, respirators, insufflations, painting with caustics; (2) cauterization; (3) heliotherapy; (4) external applications, blisters; (5) injection of superior laryngeal nerve; and (6) surgical methods. An analgesic inhalant of chloretone and adrenalin has little curative value but relieves pain. Analgesic powders, particularly a combination of anaesthesin and orthoform in equal parts, gives more relief than liquids. If there is any ulceration, it is useful to add one part of *Airol*, a Hoffman La Roche preparation, which gives off nascent iodine, and does not irritate the mucous membrane. Lactic acid must be applied frequently and vigorously to be of any use. A general hyperaemia is produced, but very little irritation is noticed. It is most useful prior to cauterization in ulcerative cases. Oedematous and ulcerative cases respond best to the galvanocautery. In the treatment of dysphagia, injection of the superior laryngeal nerve with absolute alcohol frequently gives successful and dramatic results. The relief persists for about three weeks. While silence and the galvanocautery are the two most effective methods of treatment, the additional above mentioned ways of bringing relief to patients are to be considered.—*The Treatment of Tuberculous Laryngitis in a Sanatorium, F. Heaf, Tubercle, March, 1931, xii,* 241.—(*M. E. P.*)

Treatment of Tuberculous Laryngitis.—It is well recognized that laryngeal tuberculosis has not in all cases the hopeless prognosis which was assigned to it in the past. In the treatment of this disease one may differentiate between such procedures which aim at a local healing and between measures to afford symptomatic relief. The prognosis of the local lesion depends primarily on the status of the concomitant pulmonary process and on the general condition of the patient. For the local treatment various procedures are successfully employed. Surgical removal of the lesion is indicated in small, well-defined infiltrations and ulcerations of the epiglottis, and of the true and false vocal cords. This treatment is only indicated in patients whose general condition is quite satisfactory. Nonulcerating infiltrations can be treated successfully with small doses of X-ray. Electrocautery yields frequently astonishingly good results even in such patients whose general condition is not good. The local heat application constitutes a powerful stimulus to fibrosis. Electrocautery may not be used in close proximity of hyaline cartilage and not near the anterior commissure because it may cause a synechia of the vocal cords. Very extensive lesions are contraindicated. Diathermy can be used in a similar way as electrocautery, but its results are less satisfactory because less regeneration of tissue occurs. Superficial ulcerations may be treated with 20 to 80 per cent lactic acid preceded by local anaesthesia. This treatment is indicated in patients who are not able to stand more radical treatment. Lactic-acid treatment frequently has a good effect on dysphagia. All treatments mentioned so far cannot be used in very exten-

sive processes, but heliotherapy, direct or indirect, may always be used and has a gratifying analgetic influence. The local treatment must always be supplemented by the usual general care. Tuberculin treatment is not recommended. Gold preparations may at times prove beneficial. Symptomatic relief is imperative in cases of dysphagia and stenosis. Dysphagia can be combated by the local application of anaesthetics, such as orthoform, anaesthesin or cocaine. Treatment should be given before every meal. In case of failure the superior laryngeal nerve can be blocked by the injection of alcohol, or this nerve may be resected. Ulcerations of the epiglottis causing much pain should be treated by superficial cautery. Perilous stenoses must be treated by tracheotomy.—*Die Behandlung der Kehlkopftuberkulose, E. Wessely, Wien. klin. Wchnschr., June 19, 1931, xliv, 805.—(M. P.)*

Pleural Effusions.—For practical purposes, pleural effusions may be considered as either clear or thick. Clear effusions are classified as transudates, which are of renal, cardiac or neoplastic origin; or exudates, which are of tuberculous or pyogenic origin. Coagulable proteins are less and specific gravity is lower in transudates than in exudates. Endothelial cells are found in transudates, small lymphocytes in tuberculous exudates, and polymorphonuclear cells in pyogenic exudates. In hydatid disease, which is characterized by the presence of hooklets, eosinophilia is present in about 35 per cent of the cases. Syphilis of the pleura is extremely uncommon, but, when it does occur, there is an excess of lymphocytes. Tubercle bacilli are rarely found in early effusions, but are present in almost every case of tuberculous empyema. In renal disease pleural effusions are usually bilateral and reaccumlate quickly after aspiration. In cardiac cases the fluid should be removed early, as even a small amount embarrasses the heart. With neoplasms, aspiration is necessary only when dyspnoea or pressure symptoms cause discomfort. Every case of pleural effusion should be regarded as of tuberculous origin until proved otherwise. Aspiration is indicated only for diagnostic purposes, to relieve pressure, to convert an effusion into a pneumothorax if the underlying lung is diseased, or to allow the lung to reëxpand if there is disease in the opposite lung. Forty per cent of patients with tuberculous pleural effusion develop clinical tuberculosis. Therefore, it is necessary to have watchful supervision and thorough after-treatment. Effusions frequently accompany pneumothorax. This is a true tuberculous exudate. It may increase and help maintain collapse, but it may become purulent or cause obliteration of the space by organization. The prognosis in tuberculous purulent effusions is poor. The pus should be aspirated and the pleural cavity irrigated with Dakin's solution. If it is then impossible to reëxpand the lung thoracoplasty should be performed. In pyogenic purulent effusions, the pus should be removed but an open pneumothorax avoided. An attempt is made to obliterate the empyema cavity by reëxpansion of the lung through irrigation and institution of negative pressure. Rib-resection is not advisable in any case until adhesions have formed and the fluid is frankly purulent.—*Pleural Effusion, L. S. T. Burrell, Brit. M. J., April 11, 1931, no. 3666, 619.—(M. E. P.)*

Rupture of Cold Abscess into Lung.—Tuberculous abscesses, caused by spondylitis, break very rarely into the pleural cavity or neighboring organs. Only a few such cases have been reported in the literature. One case is described in detail. A man 47 years old fell suddenly ill two months before admission to the hospital. He had chills, fever, loss of appetite and loss of weight. Ten days before admission he had a sudden paroxysm of cough, which was productive of a large amount of purulent sputum. A spondylitic abscess was diagnosed, and since Calot's solution injected into the abscess reappeared in the sputum it was assumed that this abscess had ruptured into the lung. In order to drain the abscess an operation was performed but the patient died two days after the operation of circulatory failure. On autopsy it was established that an abscess the size of a fist existed in the posterior mediastinum which originated from caries of the third thoracic vertebra. The lung was densely adherent to the abscess-wall and was torn in its removal. An open communication between abscess-wall and respiratory tract could not be demonstrated. The diagnosis of a rupture of a cold abscess into the respiratory tract rests on the following points: The demonstration of caries of the vertebra, with the formation of a postmediastinal abscess, the disclosure of pus by puncture of the abscess, and the appearance in the sputum of substances injected into the abscess.—*Durchbruch eines durch Spondylitis Tuberculosa Verursachten kalten Abscesses in die Lunge, A. Leszler, Klin. Wchnschr., September 5, 1931, x, 1671.—(M. P.)*

Tuberculosis of Stomach.—Three types of gastric tuberculosis are differentiated: miliary tuberculosis occurring with generalized miliary tuberculosis; ulcerative tuber-

culosis, usually in the pyloric region and frequently producing pyloric stenosis; and tumor-like lesions. The last named type is by far the rarest. Four such cases are reported in the literature, and one is added which occurred in a man 61 years old. He had always been well until 3 years before his death. At that time he complained of gastric pain and occasional vomiting. Periods of such symptoms alternated with symptom-free periods. At these times he would have complete anacidity. About a year later roentgenological examination showed a large round defect in the *antrum pylori*. Carcinoma was suspected and operation advised, which the patient refused because he felt fairly well. Twenty months later he developed productive cough, pain in the chest, night-sweats, fever and headaches. He lost much weight. He was admitted again, and was now cachectic and in very poor general condition. Physical and X-ray examination showed a far-advanced pulmonary tuberculosis, with excavation that had not been present 20 months before. The epigastric region was tender to pressure and a mass could be felt in this region. The long duration of the disease, the absence of metastasis and the marked local tenderness argued against the diagnosis of carcinoma. The clinical diagnosis of gastric tuberculosis was made especially on account of the recent development of pulmonary tuberculosis. The autopsy showed a dilated stomach with elevated nodular ulcerated masses in the pyloric region. The regional lymph nodes were enlarged and showed recent tuberculous involvement. The diagnosis, tuberculosis, was confirmed by histological and bacteriological studies. It is concluded that the gastric involvement occurred by the way of the blood-stream and that the pulmonary involvement was secondary to the tuberculosis of the stomach.—*Zur Kasuistik der tumorbildenden Magentuberkulose, G. E. Patronicola, Wien. klin. Wchnschr., August 14, 1931, xliv, 1051.*—(*M. P.*)

Tuberculosis of Stomach.—Tuberculosis of the stomach is a disease of adults. The incidence, as discovered at operation, is 0.34 per cent, and the average incidence derived from a series of necropsy reports is also 0.34 per cent. The most common symptoms are epigastric pain after meals, loss of weight and strength, and vomiting. Half of the cases are associated with tuberculosis elsewhere in the body. The disease is mistaken for gastric ulcer or carcinoma. The pyloric end of the stomach is the site of predilection. In practice there is little that would mark the lesion as tuberculous unless tubercles are visible. The real nature of the lesion is revealed only by microscopic examination, and even then tubercle bacilli are difficult to demonstrate in the tissues. The presence of an organic lesion can be relatively easily established, and, if surgical treatment is prescribed for all chronic gastric lesions, the rare disease of tuberculosis of the stomach does not create a new problem. In most instances evidence of tuberculosis elsewhere in the body is not a contraindication to exploration of a gastric lesion. Two cases operated on at the Mayo Clinic are reported. The history in each was fundamentally that of gastric ulcer. There was no difficulty, by clinical and laboratory means, in establishing the presence of a lesion.—*Tuberculosis of the Stomach, R. W. Good, Arch. Surg., March, 1931, xxii, 415.*—(*R. D.*)

Tuberculous Ulceration of Duodenum.—A white female, aged thirty-seven, complained of pain in the right side and an afternoon elevation of temperature, of seven weeks' duration. Roentgen examination of the gastrointestinal tract disclosed a hypotonic stomach. The duodenal bulb was persistently deformed and tender to palpation. Operation revealed a moderately thickened gall-bladder and a scarred area in the duodenal bulb. The microscopical examination of the duodenum disclosed a small group of definite tubercles in the mucous membrane which were made up of epithelial and giant cells without central necrosis and with very few lymphocytes.—*Tuberculous Ulceration of the Duodenum, R. J. Reeves, Am. J. Roentgenol. & Rad. Ther., January, 1931, xxv, 88.*—(*W. I. W.*)

Diagnosis of Early Ileocaecal Tuberculosis.—Ileocolography, using a double contrast air-barium enema, is employed in the study of ileocaecal tuberculosis, in conjunction with and after single-contrast enema and an intermediary examination. The enema studies are self-sufficient in making the diagnosis in all stages of ileocaecal tuberculosis, allowing checks to be made on all the findings. The double contrast roentgenograms reveal better than either the serial examinations with the ingested meal or the single-contrast enema roentgenograms, the anatomicopathological changes of ileocaecal tuberculosis, because both the intraluminal and parietal changes are more accurately and quickly rendered visible. This is especially true of the ileocaecal valve, whose orifice can be seen in profile as well as end on through the air filled caecum in the double contrast films. The enemas are made with greater dispatch and less annoyance to the patient and require

fewer exposures than the serial examinations.—*The Diagnosis of Early Ileocaecal Tuberculosis, J. G. Cohen, Am. J. Roentgenol. & Rad. Ther., October, 1930, xxiv, 367.*—(*W. I. W.*)

Pulmonary Tuberculosis and Intestinal Catarrh.—Attention is called to the importance of the parenteral peculiarities of the mucous membrane of the intestinal canal, as changed by catarrh. There is a marked tendency to absorb albumins. The symptoms are similar to those of tuberculous enteritis. Such intestinal processes have an unfavorable effect on patients suffering simultaneously from pulmonary tuberculosis. The treatment consists of proper elimination and a nonirritating, nourishing diet with low albumin content.—*Tuberculosis of the Lungs and Catarrh of the Intestines, J. Gwerder and L. Kalmar, Tubercle, December, 1930, xii, 97.*—(*M. E. P.*)

Tuberculous Peritonitis.—A case is reported of a girl, two years of age, who presented all the classical symptoms and signs of coeliac disease. There were marked hypotonia and wasting, especially of the glutei. The stools were large, bulky, pale, mucoid and offensive, consisting largely of split fat in the form of soaps and fatty acids. The abdomen was distended with gas. Secondary anaemia, a rather low white count, oedema of the face and extremities, and marked pyrexia were present. At necropsy, an extensive tuberculous peritonitis was found.—*Tuberculous Peritonitis Simulating Coeliac Disease, E. C. Warner, Brit. M. J., June 6, 1931, no. 3674, 977.*—(*M. E. P.*)

Primary Tuberculosis of Spleen.—This term is used to designate those cases in which the extent of the disease in the spleen is greater than that found elsewhere in the body. Three patients were operated upon with a preoperative diagnosis of Banti's disease, while pathological study of the excised spleen showed tuberculosis. The treatment for either condition is splenectomy. There is no characteristic symptomatology to aid in distinguishing primary tuberculosis of the spleen from other types of splenomegaly. The tumor in the left upper quadrant, with accompanying weakness, pain, and pressure symptoms, occurs in almost any type of splenic disease. Fever is more likely to occur in tuberculosis than in Banti's disease, but it is not necessarily present. The age-incidence is similar, hepatic enlargement may occur in association with tuberculosis of the spleen, and ascites may be found in either condition. The blood-picture is variable, but may show an anaemia with associated leucopoenia similar to that occurring in Banti's disease. The lesion in the spleen in tuberculosis may be of miliary form, a tuberculous cyst may be present, or scattered areas of necrosis may occur throughout the splenic tissue.—*Primary Tuberculosis of the Spleen: Its Clinical Resemblance to Banti's Disease, A. E. Price and R. L. Jardine, Ann. Int. Med., June, 1931, iv, 1574.*—(*R. D.*)

Tuberculosis of Bone.—The roentgenological appearance of tuberculous foci of bones is characterized by decalcification and the absence of periosteal reaction. But some cases are atypical in this regard. In the bones of the extremities in young children, tuberculous foci are seen at times which show no atrophy of the bone and in which there is evidence of varying degrees of periostitis, so that these roentgenograms are not dissimilar to those of syphilis or osteomyelitis. The appearance of such lesions may lead to the mistake in diagnosis of ostitis fibrosa. The areas of rarefaction in the bone are not due to inflammatory processes but to degeneration of bone tissue. Accordingly these areas are surrounded by bone tissue of normal structure. Three cases are reported which showed these atypical findings. They all occurred in children less than 7 years of age. The bones involved were the pelvis, ulna and humerus.—*Knochentuberkulose unter dem Bilde der Ostitis Fibrosa, S. Simon, Klin. Wchnschr., April 4, 1931, x, 646.*—(*M. P.*)

Cystic Tuberculosis of Bone.—In tuberculosis of the long bones it is unusual for the surrounding fibrotic reaction to predominate over caseation. For this reason the stationary or retrogressing bone lesion is uncommon, and this probably explains the paucity of reports of cases of cystic tuberculosis of the bone. In 1928 Jüngling was able to collect reports of 46 cases of *osteitis tuberculosa multiplex cystica* to which he added 9 of his own. The author's case is the first reported as occurring in infancy. This child was admitted at the age of one year with an incomplete history. He was a poorly developed, anaemic, rachitic child with general lymph-node enlargement, enlarged liver and spleen, diffuse enlargement of both ulnas at the elbows, and a double pyriform enlargement of the shaft of the left tibia. These tumors were firm, not tender, red, or inflamed, and in the X-ray picture had a cystic appearance, with pushing out of the cortex and periosteal thickening. X-ray of the chest showed slightly enlarged mediastinal lymph-nodes. The intracutaneous tuberculin test was strongly positive

to 0.1 mgm. The Wassermann test was also positive. Under antisyphilitic treatment there was no visible change in the bone lesions. However, a guinea pig inoculated with 1 cc. of thick white material obtained from one of the tumors by aspiration developed tuberculosis. Subsequently, under general hygienic care and continued antisyphilitic treatment, the lesions improved greatly so as to be no longer demonstrable on examination, and X-ray pictures taken one year after admission showed practically normal bones.—*Cystic Tuberculosis of the Bone, F. F. Schwentker, Am. J. Dis. Child., July, 1931, xlii, 102.*—(*M. D.*)

Tuberculosis of Intervertebral Articulations.—Tuberculous infection of the spine usually occurs haematogenously. The various types of spinal involvement are described, depending upon the blood-supply. Emphasis is laid upon tuberculous involvement of the intervertebral articulations. In this type early clinical diagnosis is difficult because of lack of deformity, and the roentgen examination must be our chief reliance for early diagnosis. The early roentgen signs are narrowing of the intervertebral disc together with erosion of the articular surfaces, but with preservation of the body form.—*Tuberculosis of the Intervertebral Articulations, H. P. Daub and C. E. Bodgley, J. Roentgenol. & Rad. Ther., March, 1931, xxv, 297.*—(*W. I. W.*)

Tuberculosis and Köhler's Disease.—Köhler's disease, which represents a peculiar condition of the tarsal scaphoid in which the bone is abnormal in size, shape and density, is thought by some to be a tuberculous process. Greenwood's contention along this line is supported by a case presented by the author. However, the latter is under no misapprehension, for he states that it may be that the tuberculosis was merely superimposed on a congenitally anomalous condition. The case was that of a boy who developed an osteitis of the tarsal scaphoid following an acute upper-respiratory infection. Swelling and pain increased, and three days later a soft tissue abscess was opened and drained. No bacteria were found either on smear or on culture. The acute condition subsided, leaving a sinus. The X-ray examination showed progressive destruction of the scaphoid. Surgical operation was done to remove the scaphoid *en masse*. Pathological examination showed tuberculosis of the scaphoid. Cultures made at the time of operation showed Staphylococcus albus.—*Tuberculosis and Köhler's Disease, D. M. Faulkner, J. Bone and Joint Surg., April, 1931, xiii, 369.*—(*J. P. B.*)

Genitourinary Tuberculosis.—The patient with genitourinary tuberculosis should be told of his condition so that he will appreciate its seriousness and become more conscientious in following the necessary course of treatment. He should be impressed with the nature of the disease, particularly its chronicity. The treatment of postoperative and inoperable tuberculosis of the genitourinary tract is along medical lines. In most cases, home treatment is the most satisfactory. Home care should be supplemented by attendance of clinics designed to handle such cases. Seventy-one cases were treated three months or more. Of these, 1 died, 11 were retrogressing, 15 were stationary, and 44 were improving. The results with the postoperative group were distinctly better than those in the inoperable group. The entire group included 26 females and 45 males. Their ages varied from 13 to 61, with an average of 34 years. The duration of treatment varied from 3 to 48, with an average of 14 months. About three-fourths of the patients were able to work at their usual occupations, either full-time or part-time. The treatment for all of the patients was along two lines: urological and general medical care. The first included local treatment when indicated; sometimes adjuvant operations were performed. For example, sluggish bladder ulcers were given light fulgurations. The general medical care consisted of all of the recognized procedures used in combating tuberculosis.—*Postoperative and Inoperable Tuberculosis of the Genitourinary Tract, S. L. Wang, Amer. J. Surg., January, 1931, ii, 88.*—(*J. P. B.*)

Tuberculous Nephritis versus Renal Tuberculosis.—Tuberculous nephritis is a very rare disease and one in which the diagnosis is difficult, especially when it comes to exclude renal tuberculosis. Little is known as yet of its course and symptoms. Autopsies on earlier cases have shown that a true chronic nephritis may be caused by the tubercle bacillus and that the kidney tends to shrink so that it is granular and atrophied. Six patients with this disease, ranging from 7 to 22 years, are reported. Of these, 3 originally had Pott's disease and three had a tuberculous hip. In each of these the osseous condition had healed in from 2 to 4 years and the illness was caused by the tuberculous nephritis. Red-blood-cell sedimentation tests "corresponded to" the tuberculous bone lesions and became normal after their healing. The size of the heart and liver and the blood-pressure remained normal. One patient experienced pain in the left lumbar region. Repeated inocula-

tions with the urinary sediment nearly always gave positive results. The urine contained albumin and sometimes a considerable number of leucocytes and a few epithelial cells. It contained, occasionally, red blood cells and almost never any casts. As to renal function it was noted that the water excretion (after Volhard) was only slightly disturbed. Indican tests, urea and sodium chloride excretion and the phloridzen test were normal. Cystoscopy revealed numerous bladder cells. In 3 of these four, tubercle bacilli were recovered from both ureters. There was a constant presence of leucocytes, a marked scarcity of epithelioid and red blood cells and virtual absence of casts, all of these speaking against ordinary nephritis. As to the differential diagnosis between tuberculous nephritis and tuberculosis of the kidney, the constant presence of leucocytes, but not in such large numbers as in pyuria, speaks for the latter diagnosis. There was never haematuria or dysuria and the functional test showed only a partial diminution. These findings are not pathognomonic of tuberculous nephritis, and this diagnosis can be made only after repeated comparative studies.—*Zur Klinik und Diagnose der Nephritis tuberculosa, S. Simon, S. Werboff and W. Gronsfeld, Deutsche med. Wchnschr., December 4, 1930, lvi, 2079.—(H. S. W.)*

Genital Tuberculosis in Women.—Tuberculosis of the uterus and tubes is generally a secondary or descending infection. While there is usually a haematogenous or lymphogenous spread, this may be due to direct extension of disease from neighboring structures. Genital tuberculosis in the female is usually preceded by trauma, such as parturition or infection with the gonococcus. The uterus is involved in about 40 per cent of the cases of tuberculosis of the female genitalia. Ordinarily only the endometrium is diseased. Tuberculosis of the uterus is usually associated with tuberculosis of the tubes. The symptoms are often masked by those of the original focus which is almost always in the lungs. Diagnosis depends upon microscopic examination of uterine curettings. Treatment consists of hysterectomy if the lesions elsewhere are such as to justify hope of arresting the disease. Tuberculous involvement of the tubes occurs in about 90 per cent of the cases of female genital tuberculosis. It is always bilateral. The process begins in the tubes and spreads to the uterus. Accurate clinical diagnosis is often difficult. Treatment consists of removal of the tubes, with preservation of the ovaries if they are not involved. A report of a case is presented, in which a young woman, a multipara, with metrorrhagia, gave essentially negative findings on physical examination. However, a diagnositic dilatation and curettage revealed a tuberculous endometritis. A hysterectomy and bilateral salpingectomy were done. The ovaries appeared normal at operation. The laboratory diagnosis was tuberculous salpingitis and endometritis. Following the operation, the patient made a quick, satisfactory recovery.—*Tuberculosis of the Uterus and Tubes, A. M. Dickinson, Amer. J. Surg., March, 1931, ii, 558.—(J. P. B.)*

Addison's Disease.—This paper deals chiefly with a study of 566 cases of Addison's disease reported in the literature from 1900 to 1929 inclusive. This period was chosen because the material was considered more reliable for study than cases from the older literature. The study also includes 29 cases of Addison's disease reported by the Department of Pathology of the University of Minnesota. The following points are emphasized: (1) the aetiology and the classification of lesions in the suprarenal glands; (2) their pathological anatomy; (3) the nature and significance of lesions elsewhere in the body; and (4) a correlation between the clinical manifestations of the disease and the changes in the suprarenal glands. Contrary to the older views, Addison's disease does not occur without lesions in the suprarenal glands. In most cases, both glands are destroyed. A few cases of unilateral lesions are recorded. In a group of 334 autopsies, the pathological changes, in the order of their frequency were bilateral tuberculosis, 229 cases; primary contracted suprarenal gland (atrophy), 66; amyloid disease, neoplasms, vascular lesions, fatty degeneration, and pyogenic infections, 39. Syphilis and metastatic tumors of the suprarenal glands are rarely seen in association with Addison's disease. Many other lesions have been described, such as pressure atrophy, hypoplasia, trauma, bone-marrow metaplasia, etc. The disease is relatively rare. Both sexes are affected. In the entire series males were more frequently affected than females. In the cases of primary contracted suprarenal gland, females predominated in the ratio of 1.6 to 1. Heredity can be considered a factor only in rare instances. The age-incidence of primary contracted suprarenal gland and that of suprarenal tuberculosis are approximately the same. The age-incidence of the latter follows closely that of deaths from tuberculosis in general. Tuberculosis of the suprarenal gland is seldom seen in the absence of tuberculous lesions elsewhere in the body. The primary focus is usually in

the lung and ordinarily it is not recognized clinically. It is a common observation that Addison's disease is seldom seen in sanatoria for tuberculosis. This is probably due to the fact that the extrasuprarenal tuberculous lesions in Addison's disease are usually small and healed, or are clinically latent. Infection takes place through the bloodstream. The medulla appears more susceptible than the cortex to infection, and it is usually completely destroyed. Remains of the cortex can be made out microscopically in most cases. From an analysis of 49 cases of tuberculosis of the suprarenal gland there is evidence that the infection is first unilateral and later bilateral. It is found that unilateral lesions are seldom extensive and but rarely destroy the entire gland. When bilateral, one gland often shows more recent and less extensive involvement than the opposite organ. The extensive alteration and exudative changes in the glands is strongly suggestive of the allergic origin of the inflammation. It is probable that the allergic state is the result of the sensitization of one organ to the tubercle bacillus or its products as the result of a previous primary infection of the opposite organ. The disease is progressive and characterized by periods of healing and periods of exacerbation. Primary contracted suprarenal gland is a disease of unknown aetiology. Two cases are described which show an early and a late stage of the disease. The pathological changes indicate that the condition is primarily a slow necrosis involving the cortical cells and leading finally to their disappearance. The inflammatory reaction is secondary to the degenerative changes, and its degree depends on the severity and tempo of the degenerative changes. Partial function is maintained by regeneration in the form of small adenoma-like nodules of cortical cells. There is no evidence that the lesion is due to infection or to the toxic products of lesions elsewhere in the body. Changes in other glands of internal secretion are relatively rare. They cannot be considered of importance in the production of symptoms of Addison's disease. The occurrence of thymic hyperplasia in association with Addison's disease is questionable. As far as could be determined, the weight of the thymus in cases of Addison's disease falls within normal limits. Anatomical changes in the sympathetic ganglia of the coeliac plexus are extremely few and variable in nature. They are not considered significant in the genesis of the symptoms of Addison's disease. Gastrointestinal lesions in the disease are infrequently observed. Peptic ulcers occur in only a few cases. They do not correspond in frequency with those that occur in adrenalectomized animals. Bilateral tuberculosis of the suprarenal glands without symptoms is not infrequently seen. These cases have been termed latent tuberculosis of the suprarenal glands. Following the loss of suprarenal tissue, whether through destructive processes or developmental disturbance, a number of compensatory mechanisms may come into play. These consist principally of hypertrophy and hyperplasia of cortical cells, chiefly of the *zona fasciculata*, hypertrophy of accessory cortical nodules and regeneration of the cortex in the form of adenoma-like nodules and small "rests" of aberrant cortical cells. In some of these cases, the mechanism is sufficient to maintain life and prevent symptoms of Addison's disease. It is probable that the absence of symptoms in many cases of bilateral destructive tuberculosis of the suprarenal glands is due to the presence of extrasuprarenal accessory cortical tissue that has escaped detection. In cases of primary contracted suprarenal gland, regeneration in the form of adenoma-like nodules is not sufficient to prevent symptoms of Addison's disease, but it is likely that the presence of these nodules may result in the prolongation of life. Tuberculosis of the suprarenal glands without symptoms should not be termed Addison's disease, as Addison did not describe a pathological condition but a clinical syndrome associated with lesions in the suprarenals. The duration of the disease is not affected by the presence of tuberculosis elsewhere in the body. The duration in primary contracted suprarenal gland is longer than that in tuberculosis of the gland; the mean for the former is 34.02 ± 4.40 months; for the latter it is 13.15 ± 2.54 months. The duration of the disease is significantly longer in cases in which pigmentation is the first and predominant symptom than in those in which pigmentation and weakness occur simultaneously and in those in which the weakness is the initial and predominant symptom. To account for the prolonged duration of the disease in the first instance, two possibilities may be suggested: (1) that the pigmentation is a manifestation of increased secretory activity on the part of the skin which compensates in some way for the disturbance in the secretory activity of the suprarenal glands, and (2) that the skin acts as a detoxifying agent and in this way compensates for the loss of suprarenal tissue. Conclusions as to the relative importance of the cortex and the medulla cannot be drawn from the study of a single case or a small group of cases, as the symptoms of the disease are extremely variable. Evidence is lacking that the symptoms occurring in primary contracted suprarenal disease differ from

those occurring in tuberculosis of the suprarenal glands. No appreciable difference in the symptomatology can be noted with varying degrees of destruction of the cortex and medulla. Available experimental and clinical evidence points to the fact that the adynamia, gastrointestinal symptoms and low blood-pressure are due to an accumulation of toxic substances subsequent to suprarenal destruction. The lethal end is due to cortical failure. All symptoms may be present in cases with anatomically normal medulla; however, a functional disturbance of the medulla as a result of alterations in synergism of the cortex and medulla cannot be denied.—*Addison's Disease; a Statistical Analysis of Five Hundred and Sixty-six Cases and a Study of the Pathology, P. H. Gutman, Arch. Path., November and December, 1930, x, 742, 894.*—(*J. S. W.*)

Vaccination Encephalitis and Tuberculous Meningitis.—In recent years the diagnosis of vaccination encephalitis in children has been frequently made in certain European countries. It may resemble tuberculous meningitis. One case is reported of a child two years old in which smallpox vaccination might possibly be regarded as a factor that was favorable to the development of tuberculous meningitis, but the illness was not a vaccination-encephalitis. Three days after a head injury, the child developed headache, languor, pallor, chilly sensations and night-sweats. Within one week, in spite of these symptoms, the child was vaccinated for smallpox. Twenty one days after vaccination, the child became apathetic and febrile and developed the classical signs of tuberculous meningitis. The spinal fluid contained tubercle bacilli.—*Impfenzephalitis oder Meningitis tuberculosa?, M. Ottow, Deutsche med. Wchnschr., December 19, 1930, lvi, 2175.*—(*H. S. W.*)

Bacteriology of Skin Tuberculosis.—Blood-cultures from patients with tuberculosis of the skin have been found positive in 62 per cent of 66 cases. This included erythema induratum, tuberculides, telangiectatic acne, annular granuloma, scrofuloderma, lupus vulgaris and lupus erythematodes. Blood-cultures are, therefore, an important diagnostic means. They are much more valuable than serological reactions which are all unreliable in skin tuberculosis. Positive blood-cultures are diagnostically more convincing than positive tuberculin reactions because the latter do not indicate whether a process is active or not. Animal inoculations yield fewer positive results and require a longer time. It must be assumed that tuberculous skin lesions are frequently due to haematogenous propagation. It is assumed that tubercle bacilli may be present in the blood-stream as long as an active lesion exists. It has been noted that blood-cultures are more frequently positive for tubercle bacilli in spring than in fall and winter.—*Zur Pathogenese der Hauttuberkulose und der Tuberkulide einschliesslich des Lupus erythematodes, O. Kren and E. Löwenstein, Wien. klin. Wchnschr., March 27, 1931, xliv, 405.*—(*M. P.*)

Haemotogenous Origin of Tuberculosis of Skin.—A total of 51 cases of cutaneous tuberculosis was examined by Löwenstein's method for tubercle bacilli in the blood-stream. Bacilli were isolated in pure culture in 38 of these. The patients had the following lesions: Erythema induratum, papulonecrotic tuberculides, acne telangiectodes, granuloma annulare, lupoid, scrofuloderma and lymphangitis tuberculosa, tuberculous ulcer, lupus vulgaris, and lupus erythematodes. It is concluded that tuberculosis is a chronic bacillaemia and that tuberculides are localized exanthematic tuberculous lesions produced by bacillary emboli.—*Zur hämatogenen Entstehung gewisser Tuberkulosen der Haut, O. Kren and E. Löewenstein, Klin. Wchnschr., May 23, 1931, x, 974.*—(*M. P.*)

Light Therapy in Lupus.—Finsen's original work was founded on the idea that the short-wave portion of the spectrum is bactericidal. Later investigators discarded this conception and attributed greater importance to the prolonged hyperaemia. In spite of this change of explanation, the Finsen irradiation method still predominates among all methods of local phototherapy in lupus. In the first place, it has the greatest penetrative power of all sources of light used locally. In order to increase penetration and avoid protracting single treatments in refractory cases, the affected tissues are opened up by preliminary cautery (pyrogallol, copper, resorcin), so as to render them more susceptible to the rays. Superimposed irradiations, as introduced by Jadassohn for the Kromayer lamp, are employed. Not every form of lupus is indicated for Finsen treatment. Flat lupus vulgaris is particularly suitable to this method. Hypertrophic, nodular or ulcerated forms may be reduced to the flat form by X-ray and carbon-arc light. The percentage of success with the Finsen treatment is 85 to 90 per cent. The Kromayer and Finsen lamps are recommended; each has its own particular field of efficacy. Both local irradiation and general phototherapy should be used. Caution is indicated in children, in people

with fair skins and in those with pulmonary tuberculosis. In spite of certain advantages claimed for each type of lamp, experience teaches that the carbon-arc method is the most satisfactory and is surpassed in efficiency only by sunlight. The much-used mercury lamp follows the carbon-arc in efficiency. The heat rays supplement the ultraviolet rays in their curative effects.—*Light Therapy in Lupus, R. Volk, Brit. J. of Actinotherap. & Physiotherap., October, 1930, v, 139.—(J. P. B.)*

Aetiology of Erythema Nodosum.—The aetiology of erythema nodosum is still an open question. Hebra and Kaposi believed in a rheumatic aetiology, while most pediatricians at the present time believe that it is most frequently associated with tuberculosis, while other authors believe that it is frequently due to syphilis. The clinical picture and the histological structure of the lesions indicate that the disease is due to pathological processes in deep skin vessels. In the early stage, damage to the vascular wall and inflammatory changes are found which, however, are never followed by ulceration. It must be assumed that the causative agent is present in the circulating blood and localizes with preferences in the vessels of the lower extremities because of mechanical conditions. The causative agent is undoubtedly not the same in all cases. The mere histological structure does not permit of a diagnosis for early lesions since early tuberculous foci are structurally nonspecific. Microscopical examination has proved that tuberculosis is an important aetiological factor in children, but that it is rare in adults. Syphilis is undoubtedly less frequently the cause of erythema nodosum. Other organisms which by direct or indirect evidence have been accused as aetiological agents are trichophyton, *Bacillus crassus*, the microörganism of lymphogranuloma inguinale, and the common causative agents of tonsillitis and sepsis. It is more than likely that not only living microörganisms but chemical agents, such as bromine and iodine for example, can cause the disease.—*Welche Aetiologie hat das Erythema nodosum?, O. Kren. Wien. klin. Wchnschr., June 5, 1931, xliv, 743.—(M. P.)*

Aetiology of Erythema Nodosum.—Bacteriological or histological proof of the tuberculous nature of erythema nodosum is wanting. The intracutaneous reaction to tuberculin is, however, positive in almost all cases. Certain of the individuals in whom negative reactions have been reported were tested only once. Ernberg and Wallgren have shown, furthermore, that the tuberculin reaction may be temporarily negative just before the appearance and just after the disappearance of erythema nodosum, even in manifestly tuberculous individuals. Certain analogies between a positive tuberculin and the nodules in erythema nodosum have been noted. The tuberculin reaction is most intense on the day that a new crop of nodules appear; the nodules contain a substance which when added to tuberculin augments the reaction; under the influence of ultraviolet light both nodules and positive tuberculin reactions recede rapidly; and in some instances a positive reaction to tuberculin is followed by the appearance of one or more erythematous nodules. The author studied 10 cases of erythema nodosum (three years to ten years of age). About one week after the disappearance of the nodules (treated with ultraviolet light) an intracutaneous tuberculin test was performed on a lower extremity. All cases had positive reactions. In 4 of the 10 children, the reaction (to 0.1 mgm. in three and 1.0 mgm. in the fourth) was followed within forty-eight hours by a crop of erythematous nodules. The author agrees with Ernberg and Wallgren that erythema nodosum is an anaphylactic phenomenon appearing in predisposed individuals coincident with the development of tuberculin-allergy (children) and with a rapid augmentation of a low degree of allergy already present (adults).—*Considerations sue l'etiologie de l'erytheme nodeux, D. Moritz, Arch. Méd. Enf., June, 1931, xxxiv, 362.—(M. D.)*

Tubercle Bacilli in Children with Erythema Nodosum.—In 37 children with erythema nodosum who gave positive tuberculin reactions, tubercle bacilli were demonstrated in 17 by inoculation into guinea pigs of the sediment obtained by gastric lavage. The test was positive more frequently in the early than in the later stages of the disease. In none of the cases were there symptoms, signs or X-ray evidence of definite pulmonary tuberculosis. In 16 children with no or significant hilar shadows, tubercle bacilli were found in 2 (12.5 per cent); in 8 with moderate enlargement of the hilar shadows, 4 were positive (50 per cent); and in 13 with great enlargement of the hilar shadows, 11 were positive (84.6 per cent). These results ought to be regarded as an argument in favor of the tuberculous nature of erythema nodosum and they indicate that patients with this disease, at least in the early stages, should be considered spreaders of infection.—*Tubercle Bacilli in Children with Erythema Nodosum: Demonstration by Gastric Lavage, A. Wallgren, Am. J. Dis. Child., April, 1931, xli, 816.—(M. D.)*

Management of Tuberculosis.—Sanatorium treatment means bed-rest during the acute febrile stages of pulmonary tuberculosis, but there is disagreement regarding the use of rest after the acute phase has passed. Some believe that merely keeping the physical activity below the fatigue level is enough, others that bed-rest should be continued long past the period when the pulse and temperature have become normal, even possibly until fibrosis has ceased. The basic principles underlying the use of rest should be analyzed. The mechanism of recovery depends on several factors. The tuberculous infection calls forth a tissue response termed allergy, which in the acute inflammatory stage is a source of danger to the host. This phase of the reaction is due to tissue hypersensitiveness and accounts for much of the symptomatology of the disease. Immunity also results and represents an increase in resistance which tends to protect the host against tuberculosis by retarding the growth and limiting the spread of tubercle bacilli. Fibrosis is part of this process. It is more active in older than in younger persons. Tuberculosis is a generalized infection which tends to break out into activity when something happens to upset the delicate balance between allergy and immunity. Its occurrence in other portions of the body is generally a result of metastasis from a pulmonary focus. All of these factors of allergy and immunity, of infection, of growth, and of metastasis enter into the picture of chronic fibroid tuberculosis. In its changing allergic state and in the variations in resistance is to be found the explanation of the relapses and remissions which are so common. In the past rest was used in the treatment of tuberculosis as it was in other diseases, that is, only during its acute phase. Thereafter exercise was permitted with an attempt to keep it below the fatigue level. Relapses which occurred were considered unavoidable. The taking of serial X-ray plates, however, revealed that the subsidence of symptoms had not meant cure, but merely that the acute inflammatory process was quieting down and that cure as represented by fibrosis was just beginning. Further study revealed that the formation of fibrosis was enhanced by rest and delayed by exercise, and also that relapses were much more likely to occur while fibrosis was forming than after encapsulation was complete. The resulting conclusion is that if bed-rest is continued until the fibrosis reaction is complete, relapses will be less frequent. The aim of restoring the patient to the status of a wage-earner is probably better served by one long sanatorium admission than by repeated short ones. Four questions are considered: *1: What patients need bed-rest?* Every patient admitted to Glen Lake Sanatorium is put on bed-rest, which means that he must remain in bed 24 hours a day. Exceptions are elderly people, "repeaters," nontuberculous conditions. Toxic patients obviously need rest, but it is felt that recovery in the nontoxic patient as well as in the toxic patient depends upon fibrosis, and that fibrosis forms more rapidly and more completely under conditions of rest than other conditions of modified exercise. Furthermore, bed-rest impresses the nontoxic patient with the seriousness of his disease and with the necessity for careful treatment, and thus does much to enable him to handle his problem. *2: How intensive should bed-rest be?* This varies with the age of the patient and the type of the lesion. Intensive bed-rest is used for acute febrile cases and young adults. The entire 24 hours is spent as quietly as possible. Sitting up, reading and writing are not permitted. The patient may or may not feed himself. Strict bed-rest is used for those who have improved or for those with nontoxic fibrocaseous or extensive fibroid lesions. Sitting up is not allowed, but a limited amount of reading, writing and occupational therapy is permitted. Regular bed-rest is used for the atoxic patient whose fibrosis is forming. Sitting up in bed is allowed. Shot bags or postural rest are utilized to supplement bed rest. *3: How long should bed-rest be continued?* The safest plan is to use bed-rest even longer than is absolutely necessary. It is recommended by some that rest of the lung by pneumothorax be maintained for three or four years. If this complete rest is wise for such a long period, bed-rest with its less complete pulmonary rest certainly should be maintained for a long period. It is therefore recommended that no change in treatment be made as long as the serial X-ray plates show an increase in fibrosis. To emphasize the point, two case histories are cited. The first was a minimal case with sputum positive only on guinea-pig inoculation. There was clearing on the X-ray until the seventh month, when for the first time bath-room privileges were allowed. The second was a moderately advanced case in which the sputum became negative at the fifth month, but the X-rays showed improvement until the thirteenth month, when bath-room privileges were granted, and no further exercise was permitted until the nineteenth month when the lesion was apparently stationary. *4: How can the patient's morale be conserved during the prolonged bed-rest?* When progress is satisfactory, vocational training, instructive reading, and occupational therapy may be carried out under

medical supervision. One should not forget that mental exercise entails work. When no further progress has been made under bed-rest the course depends on the amount of healing secured. If it is slight, then, dependent on the type and condition of the lesion, either exercise or some form of collapse therapy is indicated; if it is fairly complete, exercise may be increased, following the rule that "while the patient is improving no change in treatment is indicated." This period is a critical one, as a new outbreak of activity will require the patient to start the "cure" all over again. Note is made of the fact that under this plan 33.9 per cent of the pulmonary cases in residence are receiving some form of collapse therapy. Statistics show a definite improvement in results in 1929, as compared with 1925.—*General Management of Pulmonary Tuberculosis, E. S. Mariette, Ann. Int. Med., January, 1931, iv, 723.*—(*R. D.*)

Surgical Treatment of Pulmonary Tuberculosis.—Surgical methods of increasing rest of the lung have been developed because of late diagnosis and inefficient rest regimens. Improperly treated cases of tuberculous pleurisy often develop serious pulmonary tuberculosis and require surgical aid. Compression therapy must be considered for patients who cannot carry out the proper rest regimen. Postural rest for unilateral lesions and the use of shot-bags for bilateral lesions should be tried first for at least six months to a year. Artificial pneumothorax is the second choice, but in only one-third of the cases in which this is attempted is the result apt to be satisfactory. Septic pleurisies are reported by some authorities in 5 per cent of the successfully treated, severe pleurisies in 30 per cent, and purulent pleurisies in 4 to 11 per cent. The last-named condition may vanish under skilled treatment, or may lead to amyloid disease if thoracoplasty cannot be performed. The chief objection to pneumothorax is that it must be continued for at least three years. Improvement in the contralateral lung has been noted by Peters in 7 per cent, and progress of disease or exacerbation in this lung in 25 per cent of the cases receiving successful pneumothorax. Similar figures probably represent the results in the contralateral lung following thoracoplasty. Peters reported 42 per cent living after two to fourteen years and 24 per cent of these were in satisfactory condition. Matson, reporting 1,004 pneumothorax cases, found 32 per cent clinically well and 32 per cent dead. In general, results from artificial pneumothorax are claimed to be twice as good as without this treatment. The Jacobaeus method of intrapleural pneumolysis, improved by Matson, has slightly increased the successful results of pneumothorax. This technique applies chiefly to the string-like adhesions. Kinsella believes that if band-like adhesions cannot be severed, the hand can be inserted by thoracotomy and the cavity squeezed down. It is perhaps too early to evaluate phrenicectomy. Distressing dyspeptic symptoms occasionally occur, chiefly in cases of paralysis of the left diaphragm, but they may be only temporary. Truesdale has demonstrated displacement of the lower end of the oesophagus and a peculiar undulatory movement of the diaphragm following the operation. The operation is useful when adhesions prevent the induction of artificial pneumothorax, to help the absorption of pleural fluid, and to reduce the size of the thoracic cavity when reëxpansion is allowed, in haemoptysis, and preliminary to thoracoplasty, sometimes making this operation unnecessary. Thoracoplasty is limited to well-selected cases. The mortality rates reported during the first two months have been as high as 13 per cent. The patients selected are those with little or no disease in the contralateral lung, those in whom adhesions have prevented successful pneumothorax, those in whom large cavities near the surface would render the latter procedure dangerous, and those with a marked cirrhotic type of disease. The operation should be done in two or more stages, the ribs over the diseased area being resected first. Alexander's statistical studies show cure resulting in over 36 per cent of patients operated upon. Whatever operative procedure is followed patients must have from three to five years of skilled medical observation. Some 50 per cent of patients discharged from sanatoria die within five years following discharge.—*General Considerations of the Rôle of Surgery in Pulmonary Tuberculosis, G. B. Webb, Ann. Int. Med., October, 1930, iv, 372.*—(*R. M. F.*)

Avertin Anaesthesia in Surgical Treatment of Tuberculosis.—Anaesthesia is a serious problem in the operative treatment of tuberculosis. Avertin has found an increasing application in the last 3 years. Its rectal use (administered as an enema) spares the diseased lung, but it is not under control and deaths have been reported from its use. Several investigators have thought it superior to all other anaesthetics. Certain other people, for instance, Sauerbruch, have regarded its use as dangerous, particularly in thoracoplasty when a sudden decrease in the respiratory capacity obtains. Avertin anaesthesia, when used in 100 thoracoplastic operations, exerted no unusual influence on

the respiration. There is an initial fall in blood-pressure and cyanosis, which usually right themselves promptly. Doses of 0.12 gm. of avertin per kg. body-weight are commonly used. Complete anaesthesia is not sought and, if necessary, local anaesthesia can be used. In fat people not more than 0.08 to 0.09 gm. of avertin per kg. body-weight should be used. Before operation, a cleansing enema is given, as thus the rectal mucosa absorbs the avertin better. The after-treatment is very important. One-half hour after the operation, each patient receives a glucose enema (2 to 3 per cent) by the drop method. Should the anaesthesia persist over four hours after operation, 2 cc. of thyroxin solution is given intravenously. It would appear that avertin anaesthesia is very advantageous in thoracoplasty operation. Decrease in vital capacity is no contraindication.—*Avertinbetaubung bei Lungentuberkulose, H. Kleesattel, Deutsche med. Wchnschr., November 28, 1930, lvi, 2041.*—(*H. S. W.*)

Artificial Pneumothorax.—Early pulmonary tuberculosis heals readily if properly treated, but at least 75 per cent of tuberculosis patients have advanced disease when they come to treatment. On sanatorium rest treatment cavities, not exceeding 2 or 3 cm. in diameter, are obliterated in from 15 to 20 per cent of cases, and larger cavities occasionally close. The results of intelligently regulated rest are better than those of pneumothorax and surgery. Sputum containing tubercle bacilli in 95 per cent or more cases comes from a pulmonary cavity. Follow-up records at Loomis Sanatorium show that patients who never had a cavity or tubercle bacilli in their sputum live longest and are the least disabled; patients whose cavities closed and whose sputum became negative under treatment have the next best chance; and those whose cavities remain open and discharge tubercle bacilli in spite of treatment have the poorest prognosis. Treatment aims chiefly to prevent the spread of lesions. Cases of bilaterally extensive excavating disease, cases in which tuberculous complications or nontuberculous disease threaten death, and cases in terminal stages of tuberculosis are unsuitable for pneumothorax. In cases of the last type pneumothorax is justifiable as a last resort measure. Cases most suitable for pneumothorax are as follows: (1) extensive unilateral tuberculosis with extensive caseation and large single or multiple cavities; (2) acute unilateral pneumonic phthisis, as a type requiring prompt collapse, as caseation may occur rapidly and toxaemia is severe; (3) more chronic unilateral disease with cavities 5 cm. or more in diameter in patients having good general resistance and a tendency to fibrosis; (4) haemorrhage cases, for almost all haemoptysis in tuberculosis comes from cavities, and immediate collapse is usually indicated to prevent spread of the disease; (5) cases in which indications are less clear, which are best observed for a time to test their response to rest; and (6) certain cases of bilateral disease in which one lung is more diseased than the other, and the decision is difficult when complications exist. Healed, localized, tuberculous deposits in the better lung do not contraindicate pneumothorax, and small infiltrations often heal after the worse lung is collapsed. In a few cases of bilateral disease simultaneous bilateral pneumothorax may be given. Rest is necessary during the early months of pneumothorax. The action of pneumothorax depends upon factors which have been substantiated clinically, pathologically and experimentally. They are chiefly immobilization of the lung, obliteration of cavities and their infectious discharges, lymph stasis, and alteration of the circulation of blood in the treated lung. At Loomis Sanatorium Peters compared the ultimate fates of those patients in whom pneumothorax was indicated but could not be given, and of those in whom pneumothorax was given satisfactorily. As compared with the former group, three times as many of the latter were alive after two to fourteen years, and, of those living, three times as many were leading normal useful lives. Recently Amberson and Riggins studied 165 Loomis Sanatorium cases in which pneumothorax treatment had been completed with subsequent reëxpansion of the lung. The cases were followed for an average period of five years after reëxpansion. In 89, healing was good and the cavities were permanently closed; 78 (87.6 per cent) of these are living, and 78.2 per cent of the living are able to work or lead normal lives. In 76 healing was incomplete, and in none of these were the cavities completely closed on reëxpansion; only 35 (41.6 per cent) of these are living, and, of those living, only 48.6 per cent are able to live normally, 4 of these having had later surgical treatment. The total duration of treatment is not so important as the duration of treatment after the cavities have been closed and the sputum has become negative. Depending on variables such as the original state of the lesion and size of the excavation, the patients did well after reëxpansion, if the cavities were kept closed for from eighteen months to two years. The average total length of treatment in the most successful cases was from two to three

years.—*The Indications for and the Results of Artificial Pneumothorax Treatment in Pulmonary Tuberculosis, J. B. Amberson, Jr., Ann. Int. Med., October, 1930, iv, 343.*—(*R. M. F.*)

Artificial Pneumothorax and Tuberculous Cavities.—The classification of tuberculous cavities according to the structural characteristics of their walls, as seen roentgenologically, is possible to a certain degree of accuracy and yields data of definite value for clinical work. The classification into the three groups mentioned affords a rough means of prognosticating of cavities under pneumothorax therapy. The three principal factors influencing the closure of a cavity under pneumothorax treatment are pleural adhesions, histological structure of the cavity wall, and the type of lesions surrounding the cavity. Artificial pneumothorax offers an efficient measure for cavity compression, but should, when possible, be used early, chronologically, in the disease before cavities have had time to develop a heavy fibrous wall. The result of pneumothorax treatment in 31 patients, grouped according to the pathologico-anatomical nature of the lesions, is reported.—*The Compressions of Tuberculous Cavities by Artificial Pneumothorax, D. G. Saley, Am. J. Roentgenol. & Rad. Ther., February, 1931, xxv, 231.*—(*W. I. W.*)

Phrenic Exairesis.—From the viewpoint of eight years' experience and a series of 200 operations, the following observations are recorded: Early fears that the rise of the diaphragm might become excessive and that eventration of upper abdominal viscera into the thorax might occur have proved to be groundless. The operation is relatively free from danger and benefits many patients. The raising of sputum is made easier, and cough and pleuritic pain are lessened. Partial collapse of the lung is secured, and, even though this is slight, the lessening of pulmonary action and ventilation are of aid in the healing processes. Evidence of this lessened ventilation is to be found in the diminution of the respiratory murmur, especially over the base, on the side operated upon. When the operation was on the right side 70 per cent showed a definite rise of the diaphragm, while on the left only 55 per cent showed a comparable rise. It is to be noted that, even in the presence of extensive adhesions, a satisfactory rise may result. A tendency toward compression has been noted in 42 per cent of cavities in the midlung or base, while only 30 per cent of the cavities higher in the lung have been definitely improved. Gastrointestinal disturbances following the operation occurred in 40 per cent of the cases. They never interfered seriously with digestion and subsided in a few weeks. The operation is indicated if pneumothorax is impracticable, or has been unsuccessfully tried, in cases with a retrogressive lesion and the contralateral lung showing only minimal disease. It is indicated especially in lesions limited to the central or lower part of one lung. In most cases it is used in conjunction with pneumothorax or thoracoplasty. In the latter case it may lessen the number of ribs which require resection. The operation is contraindicated in the presence of extensive bilateral disease, although it may occasionally be of service here to relieve distressing cough or chest pain.—*Some Observations as to the Results of Phrenic-Exairesis in Pulmonary Tuberculosis, A. T. Cooper, Ann. Int. Med., June, 1931, iv, 1569.*—(*R. D.*)

Phrenicectomy in Pulmonary Cavitation.—The object of this paper was to determine the influence of phrenicectomy on the pulmonary cavity. A study was made of 200 cases of pulmonary tuberculosis with cavities, 3 cm. or larger. One hundred cases received routine cure. In 75 of the other group only phrenicectomy was done while it was performed as an accessory to artificial pneumothorax in twenty-five. In the group of patients who received only rest-cure the cavities closed in 14 per cent, decreased in size in 25 per cent, and increased in size in 61 per cent. The sputum was always positive for tubercle bacilli. Of the 14 per cent of cavities that closed 49.2 per cent reopened. The fate of the cavities in the 100 surgically treated cases (phrenicectomy) was as follows: The cavities closed in 49 per cent, decreased in size in 35 per cent and increased in size in 7 per cent. The sputum became negative for tubercle bacilli in 45.8 per cent of cases.—*The Effect of Phrenicectomy on Pulmonary Cavitation, W. I. Werner and E. J. O'Brien, J. Roentgenol. & Rad. Ther., December, 1930, xxiv, 626.*—(*W. I. W.*)

Phrenicectomy and Intercostal Neurectomy.—Unilateral diaphragmatic paralysis is useful for relief of the effects of diaphragmatic adhesions, and in selected cases of unilateral tuberculosis the operation is preferable to pneumothorax because of its comparative simplicity, freedom from complications, and because it is of benefit if pneumothorax is given later. Temporary diaphragmatic paralysis is of value in (1) bilateral tuberculosis, when pneumothorax is inoperable, and for use on each side consecutively, (2) acute and chronic stages of

nontuberculous abscess, (3) haemoptysis of tuberculous or nontuberculous origin, and (4) tuberculosis in which permanent paralysis is undesirable. Diaphragmatic paralysis probably never causes activation of tuberculosis in the contralateral lung. Multiple cervical resection of all phrenic-nerve roots is preferable to the evulsion of the main phrenic nerve, because its technique is only slightly more difficult, and the dangers of mediastinal trauma and of leaving intact an accessory root are avoided. Anatomical studies show that accessory roots are present in from 20 to 80 per cent of all persons. The author found them in the typical position in 76.6 per cent of 77 recent consecutive operations on the phrenic nerve. The lateral position is preferable to the posteroanterior for X-ray examination to determine the postoperative rise of the diaphragm. Ascent of the paralyzed diaphragm is not always necessary for a satisfactory clinical result, especially in cases of haemoptysis. Complete paralysis of a hemidiaphragm causes improvement in more than half of properly selected cases of pulmonary tuberculosis. In dogs and rabbits unilateral multiple intercostal neurectomy, preceded by phrenicectomy, greatly reduces the mobility of the thorax in quiet respiration and causes a moderate decrease in size. Dyspnoea does not result. The author used this operation in 6 cases of tuberculosis, and describes the technique. Clinical results were good in three cases; negative in one case in which bilateral disease and tuberculous complications were present; one patient died of cardiocirculatory failure contributed to by the operation; and in one case operation was too recent to permit conclusions. A phrenicectomy should precede the operation by at least one week. The two chief dangers of thoracoplasty, which are cardiocirculatory failure and spread of the lesions, are avoided. The operation impairs the function of expectoration, but extension of infection from stasis of secretions has not occurred in the author's experience. The operative mortality is less than that for thoracoplasty. Thus intercostal neurectomy may be used in cases not suitable for thoracoplasty and in those cases where pneumothorax has failed. Preoperative dyspnoea and impairment of cardiocirculatory function are permissible in greater degree than in thoracoplasty. The operation may be of benefit as a preliminary to thoracoplasty. Illustrative roentgenograms and photographs are reproduced.—*Phrenicectomy and Intercostal Neurectomy for Pulmonary Tuberculosis, John Alexander, Ann. Int. Med., October, 1930, iv, 348.*—(*R. M. F.*)

Phrenic Avulsion Forceps.—The operation of phrenic avulsion requires a gradual withdrawal of the nerve. This is usually accomplished by seizing the cut nerve with a pair of forceps and slowly winding the nerve upon them. Owing to the emergence of the nerve at the bottom of the wound, it is difficult to prevent its slipping over the end of the forceps during the process of rotation. The pair of forceps described aims at overcoming this difficulty by providing a tip which projects beyond the edges of the blade and thus prevents the nerve's slipping off. The blades have longitudinal grooves which assure a good grip on the nerve. The forceps are of a heavy type in view of the force at times required.—*Phrenic Avulsion Forceps, W. Mercer, Lancet, June 27, 1931, ccxx, 1404.*—(*R. D.*)

Scaleniotomy.—The value of surgical procedures in the treatment of pulmonary tuberculosis is becoming increasingly evident. The operations utilized are of two types, the radical extrapleural thoracoplasty, and the more conservative measures, such as extrapleural pneumolysis, phrenicectomy, intrapleural pneumolysis, and multiple intercostal neurectomy. Phrenicectomy is the simplest of these, is the most often used, and has therapeutic value even when employed alone. Heretofore, the next stage following this procedure has been the use of extrapleural thoracoplasty. A simpler adjunct will be of distinct value and may be found in scaleniotomy. Hoover has shown that the scaleni fix the first ribs and afford anchorage for the action of the upper intercostals which increase the lateral and anteroposterior diameters of the chest. When the scaleni are paralyzed, the upper 3 or 4 ribs show a cephalad motion on inspiration. These muscles therefore offer a further point of attack. *Technique:* Preliminary medication with two hypodermics of $\frac{1}{6}$ grain of morphine sulphate and $\frac{1}{150}$ grain of scopolamine is used prior to the operation under infiltration anaesthesia with 0.5 per cent solution of procaine hydrochloride. The patient is placed in the supine position with the head turned as far as possible toward the side opposite the field of operation, as this draws the sternocleidomastoid muscle out of the way and places the scaleni under tension. The incision is made 1.5 cm. above and parallel to the clavicle, and after careful division of the deep cervical fascia the omohyoid muscle and the scaleni are exposed by blunt dissection. The phrenic nerve will be found lying upon the scalenus anticus. It may be avulsed at the same operation, but, if this is to be done, the procedure is best deferred until the muscles

have been sectioned as the avulsion is the more painful procedure. About 1 cm. posterior to the insertion of the scalenus anticus, and separated from it by the subclavian artery is the insertion of the scalenius medius, while the scalenus posticus is in close approximation to this muscle. The brachial plexus and the transverse cervical vessels are in the field of operation and require careful retraction to avoid injury. The insertions of the scaleni are infiltrated with a small amount of the local anaesthetic and are carefully separated from the surrounding tissues until a straight aneurysm needle can be hooked beneath them. Division of the muscles is then accomplished, preferably by the cautery knife. After inspection for haemostasis, the wound is closed in layers. Seven cases were subjected to scaleniotomy. In the first two this procedure was carried out a week after phrenicectomy. In these patients the scaleniotomy alone resulted in a decrease of 8 to 9 per cent in the vital capacity. In the other 5 cases the two procedures were combined. In all 7 cases there was a marked reduction in the respiratory excursion of the upper part of the thorax. This is of particular significance in dealing with apical lesions, as phrenicectomy is followed by increased respiratory activity of the upper part of the chest. The operation will aid in decreasing the technical difficulty of dealing with the first rib should thoracoplasty be necessary.—*Scaleniotomy in the Surgical Treatment of Pulmonary Tuberculosis, J. W. Gale and W. S. Middleton, Arch. Surg., July, 1931, xxiii, 38.*—(*R. D.*)

Thoracoplasty.—Surgical collapse of the thoracic wall is a valuable addition to the measures previously employed in treating tuberculosis. The inflexible indications for the procedure should be (1) evidence of resistance, as indicated by fibrous-tissue reaction around the lesion, with contraction of the wall of the chest and dislocation of viscera, and (2) the impossibility of performance of a satisfactory pneumothorax. In this series of 53 cases the average duration of the tuberculosis before operation was three years. The judgment of the internist who has been in charge of the patient is all important in the matter of the ability of the better lung to withstand the strain of the operation. As changes may occur within a short time, physical and roentgen examinations should be done just before the operation. Contraindicating changes occurred in one patient and were recognized. In another they probably occurred but were unrecognized, with disastrous results. Transfusion may be an extremely valuable aid in preparing patients to withstand the operation. Routine preoperative treatment with digitalis is recommended. Reliance is placed on local anaesthesia, as it is felt that this avoids the danger of aspiration of sputum. In only 6 cases was preliminary phrenicectomy done, but this is now recommended. In the operative procedure, the lower ribs were resected first, the upper stage being done two weeks later. No partial thoracoplasties were done, as it was felt that the amount of lung conserved was not comparable with the greater collapse secured by resection of portions of all the ribs. Gentleness in the operation is emphasized. Fine silk was used for ligature and suture. No case was drained, and only three filled with blood or serum to a degree necessitating aspiration. *Results:* Fifty-three patients were operated on in the past six years. Forty-four (83 per cent) are alive and 9 (17 per cent) have died. Of the 44 alive, 35 are apparently well; that is, they have negative sputum, are free from cough, and lead a normal life. Five are improved, 1 is unimproved, and 3 are too early to classify. Fifteen of these are men, 29 women; the right side was operated on 19 times, the left 25 times. Six had had a pneumothorax which was not satisfactory owing to the accumulation of thick tuberculous pus in 2 cases, to an uncollapsed cavity in 2, and to a combination of each of these 2 factors in 2 others; all did unusually well. In the group of 9 fatal cases, death was due to the operation in 3; one died of mediastinal flutter, one from transfusion and infected wound, and one of undetermined causes. Of the 6 who died later, 2 were extremely desperate risks, 2 died of generalized tuberculosis, and 2 from extension of the disease to the good lung.—*Thoracoplasty as a Method of Treatment in Pulmonary Tuberculosis, B. N. Carter, Arch. Surg., February, 1931, xxii, 289.*—(*R. D.*)

Extrapleural Tamponage of Lung.—The operation of compressing parts of the lung by extrapleural tamponing was first advocated by Schlange. As a tampon he used iodoform gauze. Tuffier made a similar operation, using transplanted fat tissue. Baer recommended paraffine as a tampon. The authors who have used extrapleural tamponing disagree widely in regard to the operative results. Most of them are pessimistic or doubtful while a few claim excellent results. Fifteen patients are reported in whom extrapleural tamponing was done 7 to 18 months preceding this report. Before starting the operation it should be ascertained that dense pleural adhesions exist in order that the tampon can be kept in place. Tamponing is contraindicated on

top of a thin-walled cavity because the latter may burst. The indications for the operation were as follows: (1) circumscribed ulcerative processes of the upper part of the lung with tendency to retraction; (2) bilateral processes with cavity-formation when the unoperated side cannot be trusted to carry the burden of a thoracoplasty; and (3) extensive lesions in patients who can not be subjected to thoracoplasty because their general condition is too poor. In all but one patient phrenicectomy was combined with the operation. Local anaesthesia was used in all. The tampon consisted of paraffine with a melting-point between 48-52°C., 0.5 per mil vioform, 0.5 to 1 per cent bismuth carbonate. The amount used for one tampon varied between 350 and 600 gm. The operation was usually followed by slight rises in temperature, which were very likely due to some inflammatory reaction around the tampon which was demonstrable on the X-ray. Of 15 patients 9 were improved; 4 remained unimproved and 2 died, one with aspiration pneumonia and one by an exogenous infection of the operative wound. In 10 patients the sputum decreased, and in 7 cases the sputum became negative for tubercle bacilli. The advantages of this operation are the absence of severe operative shock, the minimal interference with the breathing mechanism, the possibility to produce a selective collapse and therefore the possibility to proceed bilaterally. The disadvantages are the danger of tearing into the lung while doing the pleural lysis, the possibility of aspiration of cavity contents on account of the suddeness of the compression, the danger of infection of the tissue surrounding the tampon, and the breaking of the tampon into the lung tissue.—*Ueber extrapleurale Lungenplombierung, E. Waltuch, Wien. klin. Wchnschr., April 17, 1931, xliv, 516.*—(*M. P.*)

Gelatinothorax.—Acriflavine gelatine is found to be a suitable medium for intrapleural injections. Since it is an aqueous solution it mixes in even suspension with effusions. It inhibits the growth of tubercle bacilli and pyogenic organisms. A 5 per cent solution of ordinary sheet gelatine which remains liquid at 30°C., with acriflavine added in a dilution of one to two thousand, at pH 8, was found to be most suitable. Ten patients have been treated and a few patients have responded when all other treatments failed. No contraindications have been observed.—*Gelatinothorax, R.A. Hunter, Tubercle, February, 1931, xii, 204.*—(*M.E.P.*)

Tuberculin Treatment.—The phenomena of allergy and immunity in tuberculosis are discussed. Since the effect of tuberculin in sufficient dosage is the allergic state, and since allergy is the basis of a large part of the clinical symptoms of the tuberculous, the conclusion is reached that desensitization of the allergic person with graduated doses of tuberculin should relieve him of his allergic symptoms and thus aid in his recovery. Distinction must be made between symptoms of allergic origin and those of reflex origin in the selection of cases for tuberculin therapy, as the reflex symptoms are affected only indirectly through control of inflammation by reduction of allergy. During the past year the author selected 26 cases with allergic symptoms which had failed to respond to general therapeutic measures. None of them were severe or advanced cases. Treatment in each case was begun with 0.000,75 mgm. of Mulford's Old Tuberculin and continued empirically, the size and frequency of dosage being determined by the patient's reactions and his increase in tolerance. Improvement was noted in 76 per cent. Sixteen per cent failed to receive benefit from tuberculin because of environmental factors, and only 8 per cent because of failure of the tuberculin to work. An analysis of 181 unselected cases treated with tuberculin during the past ten years is also given. Seventy nine, or 43.6 per cent, of these showed improvement attributable to tuberculin; and of these 79, forty-one, or 22 per cent of the total, showed very satisfactory results or arrest. The significance of this 22 per cent of satisfactory results among improved cases is modified by two factors, as follows: (1) approximately 50 per cent of the 181 cases were only slightly or moderately advanced; (2) in addition to tuberculin treatment every other possible therapeutic measure was used. In all of the 79 cases allergic symptoms were a prominent feature. In the 102 cases in which the results of tuberculin treatment were unsatisfactory, the signs and symptoms of the visceral-reflex type predominated. It is concluded that the results of these cases confirm the idea that tuberculin is useful in cases in which the allergic state is the basis of the patient's symptomatology.—*Tuberculin Therapy, M. J. Breuer, Ann. Int. Med., May, 1931, iv, 1447.*—(*R. M. F.*)

Friedmann's Vaccine.—Several children were treated with Friedmann's vaccine under the latter's direction and advice. Desired therapeutic results were not forthcoming and did not agree with Friedmann's deductions from the same group of children. Friedmann took the authors to task for getting negative results, but, in restatement,

the best that can be said for the experiment is that in a few of the cases there was improvement, which was about that ordinarily seen in the same type of case without any specific treatment.—*Erwiderung auf die Bemerkunge F. F. Friedmanns (D. m. W., Nr. 35) zur Arbeit Fernbach "Therapeutische Versuche mit dem Friedmannschen Tuberkuloseimpfstoff bei Kindertuberkulose" (D. m. W., Nr. 31), G. Bessau and H. Fernbach, Deutsche med. Wchnschr., October 10, 1930, lvi, 1750.—(H. S. W.)*

Chemotherapy in Tuberculosis.—After a brief historical review of the subject it is pointed out that it is particularly difficult to judge the efficacy of a therapeutic agent in tuberculosis. *In vitro* experiments do not prove anything as to therapeutic action in the body. Animal experiments are unreliable because the inoculation tuberculosis in animals is pathologically and clinically a different disease from chronic forms of human tuberculosis. Experimental work on human patients is necessarily limited, and when the experiments are done on hopelessly advanced patients, as is so frequently the case, the results are meaningless. So far the most promising results have been obtained with gold preparations. The least toxic preparations are at the present time Solganal B. and Lopion. Their therapeutic index is 30 as compared with the therapeutic index of 2.5 in the case of sanocrysin. It was assumed in the beginning that gold salts act as true chemotherapeutical agents by killing tubercle bacilli in the tissues. Therefore large doses were given; but it is well recognized now that small doses work better, and that the action of these preparations is not that of a chemotherapeutical agent. Gold salts have a specific affinity for tuberculous foci, and they produce reactions which are very similar to tuberculin reactions. Nontuberculous patients do not show the same reactions to gold as do tuberculous ones. A violent tuberculin reaction can be aborted by the administration of gold salts. By treatment with gold salts the condition can be improved for a subsequent tuberculin treatment. In practical therapy very small doses should be used and the injections should be given at intervals of one to three weeks. Tuberculosis of the intestines and of the kidneys contraindicate gold treatment. The gold dermatitis which is sometimes observed 12 to 24 hours after the injection clears usually rapidly and it was observed that adrenalin and pituitrin help to terminate this ill effect.—*Ueber die Chemotherapie der Tuberkulose, H. Molitor, Wien. klin. Wchnschr., May 15, 1931, xliv, 645.—(M. P.)*

Treatment of Tuberculosis with Splenic Extract.—A number of authors have claimed favorable results from the treatment of tuberculosis by the administration of spleen or splenic extract. Forty-one patients with far-advanced pulmonary tuberculosis were treated with splenic extract (splenoglandol) in doses equivalent to 120 gm. of fresh spleen per day. This was continued for from 6 weeks to 5 months. A favorable influence was thought to be observed in 17 patients, the improvement being indicated by diminution in toxic symptoms, gradual lessening of fever, cough and expectoration. The physical and X-ray examinations, however, rarely showed more improvement than sometimes occurs in similar cases. In one case the sputum became negative.—*Ueber Organtherapie bei Lungentuberkulose, J. Leitner, Deutsche med. Wchnschr., December 5, 1930, lvi, 2082.—(H. S. W.)*

Heliotherapy in Tuberculosis.—Conclusive evidence has been presented by many observers to show that wave-lengths of from 3,900 to 8,000 Angstrom units (visible) are a necessary adjunct to the biotic or vital rays (2800 to 3800 Angstrom units), whether from the sun or from an artificial source such as the carbon-arc. Effects of these wave lengths are as follows: *1:* Erythema and slight tanning accompanied by improvement in the health, texture and function of the skin. *2:* Increase in haemoglobin, erythrocytes and platelets. The lymphocytes decrease at first and later increase. The polynuclear cells are increased. *3:* Bringing of the calcium-phosphorus balance to normal. *4:* Lowering of the blood-pressure, with at first rise in the pulse-rate and later return to normal or below. *5:* Initial rise of body temperature with return to within one degree of normal shortly after irradiation has ceased. *6:* Improvement in elimination without increase in basal metabolism. Blood-urea nitrogen is reduced and nutrition is improved. *7:* Improvement in nutrition and tone of muscles. *8:* Stimulation of healing and specific effect on tuberculous processes. *9:* Absorption of the energy of the rays by the blood-stream. *10:* Liberation of tuberculin in controllable amounts. The indications for heliotherapy are as follows: (1) all extrapulmonary tuberculosis, reactions being avoided if a pulmonary lesion is present; (2) all childhood types of tracheobronchial tuberculosis; and (3) those cases of adult type of pulmonary tuberculosis which in spite of other treatment remain stationary or lose ground. Heliotherapy should never be used in exudative types of pulmonary tuberculosis. Treat-

ment of the various types is discussed in detail. The carbon-arc is preferred as an artificial source of heliotherapeutic rays. Rollier's schedule for daily exposure is reproduced.—*Present Status of Heliotherapy in Tuberculosis, C. K. Petter, Ann. Int. Med., May, 1931, iv, 1447.*—(*R. M. F.*)

Heliotherapy in Pulmonary Tuberculosis.—While the success of light therapy is undisputed in extrapulmonary tuberculosis, there is no consensus of opinion on the therapeutic action of light in tuberculosis of the pulmonary parenchyma. Focal reactions in the lungs follow irradiation of the skin. The explanation for this is that substances from the irradiated skin get into the circulation, and irritate and inflame the susceptible tuberculous lung tissue. Irradiation not only speeds up the volume-flow of the blood, but also increases the circulation of the lymph. Variations in the flow of the lymph in the parietal pleura cause changes in the condition of the skin overlying those areas. Because of the anatomical relationship existing between the thoracic and cervical lymphatics, the influence of disease in the former is shown in a swelling in the neck on the corresponding side. Relief of this lymphatic congestion is best obtained by improving the lymphatic circulation all over the body; this is accomplished by general irradiation. Only the apyretic, clinically inactive, cirrhotic cases or those inclining to cirrhosis should be treated. Unstable cases which react (by fluctuations in temperature) to exercise, psychic influence, etc., are to be excluded. Irradiation is discontinued if the temperature rises or if focal reactions appear. In general the results obtained are good. A plea is made for a more uniform classification, such as W. Neumann's which is based on that of Bard-Piery, and also for the employment of artificial light irradiation so that results can be compared.—*Light Therapy in Pulmonary Tuberculosis, J. Sorgo, Brit. J. Actinotherap. & Physiotherap., October, 1930, v, 149.*—(*J. P. B.*)

Heliotherapy in Pulmonary Tuberculosis.—The effect of carefully controlled exposure of the body surface to the direct rays of the sun in Southern Arizona has been studied in a series of 200 cases of pulmonary tuberculosis during the past five years. Almost every type and stage of the disease except acute or rapidly progressive cases and surgical forms of tuberculosis have been included. The number of patients showing appreciable improvement that might be attributed solely to direct heliotherapy was negligible. It was clearly demonstrated that carefully supervised general irradiations do not tend to produce haemoptysis, but constant alertness was necessary to control exposures so as to avoid focal reactions. There were some indications that patients with chronic fibrosis might be benefited by indirect radiations from sky reflections, but direct heliotherapy was obviously dangerous. Mathematical precision in measuring dosage was impracticable, as considerable variation in amount of solar radiations was tolerated without clinical manifestations. Results derived from direct heliotherapy in pleural tuberculosis and tracheobronchial lymph-node disease were gratifying, and it appeared that this treatment was of value in preventing the development of intrapulmonary lesions in hilum tuberculosis and primary pleural involvement.—*The Limitations of Heliotherapy in Pulmonary Tuberculosis, B. L. Wyatt, Ann. Int. Med., October, 1930, iv, 376.*—(*R. M. F.*)

Treatment of Tuberculosis with Artificial Light.—Artificial-light treatment, undertaken at dispensaries by tuberculosis officers, has given satisfactory results in cases of tuberculosis of the skin and of tuberculous adenitis. Of the total number taking treatment, 77 per cent were able to continue work and so were less of an economic burden to themselves and the community. In regard to 60 skin cases which became "quiescent and apparently cured," the average duration of the disease before patients commenced light treatment was 10 years, 8 months, whereas the average duration of light treatment was 10 months. Of 252 cases which became "quiescent and apparently cured," the average duration of the disease before the patients commenced light treatment was 4 years, 8 months, whereas the average duration of light treatment was 9 months.—*Results of Artificial Light Treatment for Tuberculosis, G. L. Cox, Brit. J. Actinotherap. & Physiotherap., October, 1930, v, 143.*—(*J. P. B.*)

Treatment of Tuberculosis by Ultraviolet Light.—From January, 1925, to December, 1929, 261 patients were treated with ultraviolet light in the Tynemouth Municipal Clinic. The conditions treated included pulmonary tuberculosis, with and without positive sputum, pretuberculous conditions (undernourished people), and tuberculosis of bones, joints, skin, abdomen, lymph nodes and kidney. In the cases of pulmonary tuberculosis results were disappointing. Of the 26 patients treated, one-half with tubercle bacilli in the sputum and the other half without, only two showed satisfactory results. In the cases that did

not improve, it was found that numerous changes in dosage and in the intervals between treatments were of no avail. The results of sanatorium regimen are thus much more satisfactory than those of actinotherapy. In tuberculous adenitis the results were very gratifying. The series comprised 84 patients, most of whom were children with cervical adenitis. In 39 of these cases, the skin was not involved and abscess-formation was not present. Satisfactory results were recorded in all types of lymphatic infection, and in tuberculous adenitis with abscess-formation there were no failures. The duration of treatment required to produce complete quiescence in the lymph nodes averaged five months; the shortest being one month. Excluding adenitis with abscess-formation, the types that responded best to treatment were the ones in which the onset and enlargement were rapid and not too widespread. Patients with numerous small lymph-node enlargements required more tedious treatment but improvement was observed in a few cases. Irradiation was tried not only for its obvious beneficial effect on tuberculosis but also for its tonic effect on metabolism in the less hopeful cases. Treatment was administered to 40 persons suffering from various forms of tuberculosis of the skin. In the ulcerative types, healing occurred more rapidly and more frequently, the average healing time being four months as against ten months in lupus vulgaris. The fibrotic type of lupus is, however, much less amenable to treatment. In tuberculosis of bones and joints, it is necessary to employ the recognized conservative methods and immobilization by splints and other apparatus whenever these are indicated. Ultraviolet light provides a stimulus to the formation of healthy granulation tissue and promotes regeneration of bone, with the result that sinuses close much more readily than in similar nonradiated cases. The relatively few disappointments were seen in advanced cases of several years' duration. Synovial infections in the knee-joint, with its indolent swelling, presented some difficulty. In the cases of tuberculosis of the abdomen where many different grades and varieties of tuberculous infection existed, the results varied accordingly. Tuberculous peritonitis was markedly benefited after ultraviolet treatment. The lymphatic and intestinal types gave "mixed" results. When generalized tuberculosis existed with abdominal manifestations, the treatment was of no avail. In the heterogeneous collection of 43 patients known as pretuberculous, ultraviolet radiation gave results that were sometimes good and sometimes not. A review of the cases showed the difficulty of determining which should be treated by radiation. Even with this difficulty of selecting cases, it was found that about 80 per cent of pretuberculous children were benefited in some measure. Cases of long-standing bronchitis and catarrh showed no improvement. The effect of radiation on genitourinary tuberculosis and tuberculous laryngitis was disappointing. These were in an advanced stage when seen in the clinic. After discussing the beneficial effects of ultravilet radiation on the above conditions, the comparative cost of treatment of irradiation with sanatorium treatment is to be considered. While sanatorium treatment is the best form of treatment, it is also the most expensive. The number of beds required to take care of all the tuberculosis patients would be prohibitive. This is where ultraviolet treatment can supplement in a practical, economical way.—*U-V Treatment of Tuberculosis at a Municipal Clinic, J. O. Murray, Brit. J. Actinother. & Physiother. October, 1930, v, 135.*—(*J. P. B.*)

Treatment of Tuberculous Cervical Adenitis by Ultraviolet Light.—The methods which have been found to be best in the treatment of 201 patients suffering from tuberculous cervical adenitis consist of residence in the open air, rest, nourishing food which contains an abundance of vitamines A and D, exposure to erythema-producing doses of ultraviolet light twice a week, aspiration of fluctuant lymph nodes and, in certain cases, excision of the latter. When practicable, institutional treatment was used, for this puts the patient in the most beneficial hygienic surroundings. However, the majority of the patients treated attended outpatient departments. The affected area was shielded from the light so as to reduce the liability to sinus-formation. Also, excision of the lymph nodes was done only when the latter were palpable, freely movable and hard. The results obtained in connection with the general condition of the patient, the lymph nodes and discharging sinuses were as follows: In regard to (1) the general condition, 162 gained weight, 29 remained stationary and 10 lost weight. Twenty-four patients developed active pulmonary tuberculosis during the course of treatment, but six of these had pulmonary lesions previously. In regard to (2) the presence of multiple lymph-node involvement, which included 162 patients, 52 were markedly improved, 19 developed abscesses which resolved after aspiration, 87 improved in general health and experienced diminution in the lymph-node enlargement, 14 remained unchanged, and 9 became worse.

In regard to (3) discharging sinuses, it developed that 21 patients had this complication at the start, of which 10 healed and the lymph nodes disappeared entirely; 8 healed but the lymph nodes were still enlarged after treatment and 3 showed no improvement. In regard to (4) hard single lymph nodes, there were 18, of which 5 formed abscesses but healed completely following aspiration, and 10 were excised. Of these 10, there was no further evidence of disease in 7, but 3 showed enlargement of other lymph nodes later. Light treatment caused disappearance in two and no change in the other one.—*Tuberculosis of Cervical Glands and Ultra-Violet Light Therapy, C. L. Pattison, Brit. J. Actinotherap. & Physiotherap., October, 1930, v, 148.*—(*J. P. B.*)

Treatment of Pleural Tuberculosis by Ultraviolet and Infrared Rays and Diathermy.—That beneficial results may be obtained by light treatment in certain cases of tuberculosis of the pleura is recognized. Treatment by diathermy and infrared rays usually causes vasodilatation and an increase in temperature. These phenomena stimulate osmotic exchange and reduce the pressure while increasing the flow of circulation, thus favoring the drainage of pleural effusions toward the circulatory and lymphatic systems. Besides stimulating drainage, diathermy and infrared rays stimulate defensive reactions by taking up the congestion and diffusing it (revulsive action), and by increasing the absorption of young connective tissue. Ultraviolet irradiation has a general effect on the body. Some degree of caution is necessary when using light treatment, especially if there are parenchymatous lesions in the lung. In regard to treatment, it is important to emphasize the value of irradiating the whole body, including the thorax, with ultraviolet light, of applying the infrared light over the site of the pleural affection, and of passing high frequency, low-tension current (with continuous waves) through the entire affected side.—*Treatment of Tuberculosis of the Pleura by Ultra-Violet Rays, Infra-Red Rays and Diathermy, E. and H. Biancani, Brit. J. Actinotherap. & Physiotherap., October, 1930, v, 147.*—(*J. P. B.*)

Treatment of Tuberculous Peritonitis by Light-Bath.—Not only in clinically diganosed cases of tuberculous peritonitis but also in cases confirmed by exploratory laparotomy, the value of light-bath treatment was demonstrated. This opinion was held even after discounting the tendency to spontaneous cure following operation. The technique employed at the Finsen Light Institute was that described by Reyn, Collin and Christensen. Light acts not in any specific way against tuberculosis but by improving the patient's general condition and thus his resistance.—*Light Bath Treatment of Tuberculous Peritonitis, O. Chievitz, Brit. J. Actinotherap. & Physiotherap., October, 1930, v, 142.*—(*J. P. B.*)

Asthma and Tuberculosis.—Change in position or quick movements may cause shortness of breath and a feeling of oppression in the tuberculosis patient. This is explained as due to tension on pleuritic adhesions and consequent nervous irritation. Alteration in the trunk posture and respiratory exercises will stretch and massage the adhesions and give relief. Mouth-breathing with consequent undue drying of the mucus in the bronchial tree will produce irritation and paroxysms of coughing attended by dyspnoea. Education in nose breathing will bring amelioration of the symptoms.—*Asthma and Tuberculosis, L. Hofbauer, Brit. J. Tuberc., April, 1931, xxv, 77.*—(*R.D.*)

Tubercle Bacilli in Blood in Bronchial Asthma.—In 2 patients who showed the characteristic clinical picture of bronchial asthma without any evidence of an active tuberculous pulmonary process, tubercle bacilli were isolated from the blood-stream. The attacks in both patients were perfectly typical and no sign or symptom caused tuberculosis to be suspected. It is difficult at the present time to interpret these findings. The bacillaemia and the asthma may be unrelated or they may be causally connected. It remains to be studied how frequently tubercle bacilli can be found in the blood-stream of asthmatic patients. The tubercle bacilli were demonstrated by Löwenstein's method.—*Zwei Fälle von Tuberkulobazillämie bei Asthma bronchiale, A. Kenner, Wien. klin. Wchnschr., June 5, 1931, xliv, 732.*—(*M. P.*)

Asthma in Children.—Asthma in childhood is a much more frequent disease than is usually assumed. Two typical forms should be differentiated,—the genuine asthmatic attack and asthmatic bronchitis. The latter is more frequent in infancy while the former is more frequent in later childhood. Both conditions are pathogenetically very similar, and it is therefore justifiable to use Czerny's term "asthmatic reaction." This asthmatic reaction is probably the manifestation of a constitutional peculiarity. It causes hypersensitivity of the respiratory and nervous systems. When the hypersensitivity of the nervous system is more pronounced genuine asthmatic attacks are

frequently associated with eczema. It is very questionable whether specific allergy plays as important a rôle in childhood as has been assumed. The hereditary factor is undoubtedly of great importance. Parents of asthmatic children suffer frequently from chronic respiratory diseases. Asthmatic children frequently develop secondarily bronchiectasis and fibrosis. The most important therapeutic factor is climate. It seems that treatment in high altitudes is most promising. When this form of treatment is impossible, air-baths, sleeping with open windows, and general hygienic treatment are important. Ultraviolet radiation is a significant auxiliary. In older children the teaching of the proper breathing technique is important. In the asthmatic attack in childhood adrenalin is usually unsuccessful. Expectorants during or after the attack are contraindicated because an increase of secretion will aggravate the condition. Sedatives, such as chloral hydrate or urethan and in older children morphia, if necessary, are definitely indicated. The bronchospasm can be relieved by atropin or belladonna. Iodine helps to decrease secretion. Long-continued calcium medication in large doses increases the action of ultraviolet radiation.—*Asthma im Kindesalter, R. Lederer, Wien. klin. Wchnschr., April 3, 1931, xliv, 454.*—(*M. P.*)

Small Hearts in Asthmatics.—The small heart is frequent in asthmatics. An analysis of a considerable number of patients, 27 of whom are reported in some detail, led to the conclusion that the small heart is not caused by the asthma but that it is present before attacks occur. It is not, as has been claimed, the result of an increase in the thoracic pressure which does not exist, nor a result of the reduced state of nourishment, but it is probably part of the general hypoplasia frequently present in asthmatics and particularly manifest in their vascular system. Other frequently observed aplastic phenomena in asthmatics are the weakness of the elastic tissue in their lungs, the underdevelopment of their musculature including the diaphragm, and premature senile changes in the costal cartilages and intravertebral discs. The psychological behavior of the asthmatic, usually characterized by a marked impressionability of his nervous and mental functions, might be another part of his hypoplastic constitution.—*Das kleine Herz der Asthmatiker, H. von Hoesslin, Klin. Wchnschr., October 10, 1931, x, 1893.*—(*M. P.*)

Infarction of Heart.—A case is reported of a Moslem male, 28 years of age, suffering from advanced pulmonary tuberculosis, who developed symptoms and signs of infarction of the myocardium. Later, a pericardial effusion developed. There were no tubercle bacilli found in this pericardial fluid, and guinea-pig inoculation was negative. There were no clinical manifestations of atheroma, hyperpiesis, arteriosclerosis, syphilis, rheumatic fever, gout, or diabetes, these conditions being the ones with which infarction of the myocardium is commonly associated.—*Infarction of the Heart with Pericardial Effusion in a Young Phthisical Subject. T. A. Hughes and M. Yusuf, Brit. M. J., May 9, 1931, no. 3670, 794.*—(*M. E. P.*)

Chronic Pulmonary Infections.—The discussion is limited to localized processes whose pathology and aetiology are doubtful, though certainly nontuberculous. Possibly they are the precursors of bronchiectasis, recurrent bronchopneumonia, asthma, or abscess. They come under observation at necropsy only accidentally, and it is questionable whether routine examination would detect definite pathological changes. The usual history reveals increasing susceptibility to colds in a child or young adult over a period of several years. Then a severe winter cold assumes the picture of bronchopneumonia and persistent changes are found in the lungs, usually in the base or midfield, as shown by X-ray and stethoscopic examinations. Old focal changes in reality antedated the pneumonia, which was only an acute incident in the more or less prolonged course of a chronic process. Symptoms of asthmatic nature may appear following the pneumonia. The question arises whether or not there is such a condition as permanent pulmonary change set up by infection of a chronic and clinically persistent nature that is not demonstrated by ordinary diagnostic methods. The râles may not disappear even with weeks in bed. They frequently persist until the coming of summer, but may be present throughout the year. The next winter the symptoms reappear and râles are heard over the same area as before. The localized nature of the lesions simulates beginning tuberculosis and prevents their being regarded as chronic bronchitis, which is a diffuse involvement of the air-passages. It is presumed that a permanent and at the same time a latent focus of infection is reactivated and takes on new clinical significance under the influence of the obscure biological and immunological agents which we know are set in motion by the common cold. Probably the localized inflammation results in fibrosis with a concurrent limited lymphangitis of the alveoli and bronchioles. Thus the field is prepared

for localized bronchiectasis, or abscess, or "asthmatoid" phenomena. Asthmatic symptoms appear only after colds have recurred many times. Features of hypersensitiveness and heredity are absent. Mechanical irritation seems to be the most probable explanation of the asthmatic symptoms. Treatment should be begun early, especially in children, when perhaps anatomical changes cannot be demonstrated. Abnormalities of ears, nose, throat, and sinuses should be corrected. A climate where colds are reduced to a minimum should be selected, and this is usually one that is warm and dry. Treatment may require several years.—*Remarks on Chronic Infections, A. K. Krause, Ann. Int. Med., November, 1930, iv, 455.*—(*R. M. F.*)

Chronic Pulmonary Infections in Childhood.—A better understanding of tuberculosis in recent years has caused increasing doubt that there is any unusual or excessive susceptibility to tuberculosis during the formative years. The prognosis of tuberculosis of any part of the body, of adults and children, improves in direct proportion to our ability to recognize it. Tuberculosis is essentially a nonprogressive infection in all ages of life. The mortality from tuberculosis is lowest during childhood (excluding infancy), and this is the period when infections are received most frequently. The morbid effects of the tubercle bacillus in the child usually suggest unusual tolerance for the bacillus. Tuberculosis is either clinically active or clinically inactive. There is no "latent" state. With the presence of tubercle proved, any functional aberration that can be connected with it justifies the diagnosis of active tuberculosis. The only exceptions are the functional derangements set up by the remnants of healed tubercle. The possibility of the presence of bronchiectasis, lung abscess, or "chronic interstitial pneumonia" must not be forgotten. Bronchiectasis is far more disabling than tuberculosis, and it is much easier to cure tuberculosis. Thus it is of great importance to recognize all focal changes of infectious nature in the lungs of children. Much ill health in childhood that passes for disturbances in the upper respiratory tract is actually the expression of chronic intrapulmonic infection. Also, much of the bronchopneumonia of childhood is merely an acute event in the course of a preëxistent chronic infectious process. Usually there is a history of increasing oversusceptibility to colds. As the child recovers from his acute bronchopneumonia, râles are found to persist over the site of the lesion, and X-ray changes persist still longer. Usually this nontuberculous lesion was present before the bronchopneumonia supervened. This condition of focal nontuberculosis infection ranks in frequency of occurrence and in gravity with tuberculosis. Several illustrative cases are discussed. None of these children had symptoms, signs, or X-ray findings warranting the diagnosis of clinical tuberculosis, though the lesions were always basal. The same type of illness occurs in adults, and may recur over a period of years. A case which began at the age of 37 years and has lasted 16 years is described. The lesion, in the base of the left lung, has recently developed an abscess. Symptoms suggestive of asthma often occur. The guiding principle of treatment of the minimal processes will be that regimen in that environment that reduces to a minimum the chances of acutely exacerbating the focus. If treated early enough and long periods of quiescence are allowed healing may occur.—*Chronic Pulmonary Infections in Childhood, A. K. Krause, Ann. Int. Med., May, 1931, iv, 1424.*—(*R. M. F.*)

Surgical Treatment of Pulmonary Abscess.—Not many pulmonary abscesses will heal under conservative treatment, that is, postural drainage, neosalvarsan, transpulmin, emetin, vaccine therapy, etc. The indications for artificial pneumothorax in the treatment of pulmonary abscesses are still under discussion. There is always the danger of producing empyema and the danger of perforation of the abscess into the pneumothorax cavity. In spite of these perils some patients do well under pneumothorax treatment. A more radical surgical treatment is indicated if after 5 or 6 weeks no improvement is noted. In case of septic symptoms or gangrene operation is urgent. If the pleura is well adherent in the region of the abscess, the abscess may be opened immediately after the resection of two or three ribs, if this is not the case, a two stage operation is indicated. Sauerbruch recommends a paraffine tampon to produce pleural adhesions. Even after abscesses have been successfully incised and emptied, postoperative dangers have to be considered, such as haemorrhages from the abscess cavity, and bronchial fistulae which may persist for long periods of time. In gangrenous processes the disease may progress in spite of wide incision. In the author's own experience 19 patients were operated for pulmonary abscesses of which 13 were cured and 6 died.—*Worin besteht die chirurgische Behandlung der Lungenabszesse?, P. Walzel, Wien. klin. Wchnschr., May 29, 1931, xliv, 713.*—(*M. P.*)

Empyema.—To appreciate the rationale of modern treatment of empyema, it is necessary to understand the physiology of open pneumothorax. The mediastinum is not a rigid structure and has no great resistant value. If an opening is made into a pleural cavity of a healthy individual, the alterations in pressure in that side are immediately reproduced to an almost similar extent in the opposite side. Positive pressure on the surface of the lung prevents the suction of air down the trachea into the lungs. Compensation is made by an increase in the amplitude of the respirations. Success depends on the capacity of the individual to make the exertion and on the size of the opening into the pleural cavity. Failure means death by asphyxia. The mediastinum moves to and fro with expiration and inspiration, causing great cardiac embarrassment; there is stasis of the venous system, owing to loss of aspiration by the heart of the venous blood; there is great loss of heat from the exposed pleural cavity; and there is the danger of suction of infected material into the pleural cavity. However, in an extreme case of chronic empyema, the lung and mediastinum are fixed by adhesions, and the open pleura has all the characteristics of an extrathoracic cavity. The only dangers then are sepsis and loss of heat. In empyema associated with pneumonia there is a great loss of functional pulmonary tissue due to consolidation and compression. This reduces vital capacity and is more marked in pneumococcal pneumonia in which there is more localization of the lesions, than a widespread streptococcal pneumonia. If an individual with healthy lungs and a good vital capacity experiences embarrassment by an opening into the pleural cavity, how much more serious an effect must such an opening have in a patient with pneumonia, particularly in a streptococcal infection? An empyema due to the pneumococcus is a comparatively late manifestation of the disease. Resolution usually is taking place. The vital capacity is increasing and the rate of metabolism is diminishing. Moreover, the pus is rich in fibrin, forming a deposit on the pleura and fixing the lung and mediastinum. The danger associated with making an opening into the pleural cavity is therefore comparatively small. On the other hand, empyema in a streptococcal pneumonia begins early in the course of the illness and adhesions do not form until two or three weeks following the onset. Therefore, an opening made in the earlier stages exposes the patient to all the dangers of an open pneumothorax, at a time when vital capacity, toxaemia, and increased metabolism make him least able to tolerate it. But if the pus is not removed, the patient may die from toxaemia, anoxaemia or heart failure. Simple aspiration, therefore, is the first line of treatment. It relieves the symptoms and allows time for the identification of the causative organism. The amount which can be withdrawn varies according to the size of the effusion, the amount of displacement and fixation of the intrathoracic organs, and the expansile capacity of the affected lung. The onset of cough or of pain in the chest is an indication that the limit of safe withdrawal of fluid has been reached. In order to overcome symptoms of excessive negative pressure, the fluid may be replaced by air or oxygen. If simple aspiration fails, suction drainage with irrigation through an air-tight opening is indicated. By the time the effusion has become frankly purulent the pleural membranes are thickened, and the lung and mediastinum are immobilized. Open operation for drainage, either through an intercostal space or by rib-resection, can then be considered. Rib-resection, while more of a strain on an already debilitated patient, usually permits more adequate drainage. Irrigation with Dakin's solution frees the lung of its pathological deposit and assists in reëxpansion. High caloric food-intake and forced fluids are essential in the general care of the patient. Breathing and blowing exercises aid in the obliteration of the cavity. The causes of chronicity in empyema include unrecognized cases until the pleura has become rigid; insufficient drainage or irrigation; reinfection; presence of a foreign body, such as rib-fragments or drainage-tubes; unavoidable complications, such as bronchial fistula with fibrosis of the lung sometimes occurring in tuberculosis or actinomycosis. If these factors cannot be eliminated, then the major operative procedures are indicated. The object of these is to mobilize the chest-wall by denuding it of the ribs over the affected area, and at the same time mobilizing the lung by decortication; that is, stripping the organized lymph off the lung and pleura. When dealing with a cavity of any size, mobilization of the chest-wall alone or of the lung alone is rarely adequate. The operations must be performed in a series of stages, and it is most important that approximation should start at the apex and that apposition should be secured over the upper area before an attempt is made to obliterate the lower segment.—*Remarks on Empyema Thoracis, H. M. Davies, Brit. M. J., April 4, 1931, no. 3665, 569.*—(*M. E. P.*)

Closed Drainage in Empyema.—Empyema is not to be regarded as a surgical emergency requiring operation as soon as it

is diagnosed. It is necessary to wait until adhesions between the lung and chest-wall are sufficiently firm to prevent the lung from retracting when the thorax is opened. It is also advisable in most cases to wait until the pneumonic process has subsided before continuous drainage is instituted. Aspiration is continued for a longer period of time in streptococcic than in pneumococcic infections, as firm adhesions do not form as quickly. Irrigation of the cavity is indicated. Dakin's solution is used to overcome the infection, to liquefy the masses of fibrin, and to soften the exudate which covers the lung and impedes its expansion. Negative pressure assists in the expansion of the lung and the obliteration of the cavity. The closed method of drainage is advocated by the author after treatment of more than 50 cases of empyema by this method. He describes a simple apparatus which permits closed drainage and irrigation of the cavity. By this method the mortality rate is lowered, particularly in infants, due probably to the lessening of dangers from general anaesthesia, surgical trauma and secondary infections. The duration of illness is also shortened, the average number of days being 25.06 days, while the average by the open method is six weeks.—*Closed Drainage in the Treatment of Empyema, J. D. McEachern, Brit. M. J., March 7, 1931, no. 3661, 389.*—(*M. E. P.*)

Acute Bronchiolectasis.—A case is reported of a female child, aged three months, with symptoms and signs of bronchopneumonia, who died 16 days after the onset of the illness. Autopsy revealed an extensive bronchopneumonia and bronchiolitis. The cavities and abcesses in the lungs were found to be dilated bronchioles. Staphylococci were present in the abscesses. The pathogenesis of the disease is difficult to elucidate. The comparative rarity of the bronchiolectasis makes it impossible to believe that it is compensatory in origin. It may be possible to find an explanation for the bronchiolectasis in an inflammatory softening of the wall, in an infection by the staphylococcus causing well-marked local destructive changes, or in the presence of a certain degree of peribronchiolitic collapse. The infection is evidently primarily a bronchiolitis with subsequent bronchopneumonic changes.—*A Case of Acute Bronchiolectasis, H. H. Stewart and J. H. Biggart, Brit. M. J., June 27, 1931, no. 3677, 1115.*—(*M. E. P.*)

Spontaneous Pneumothorax.—Spontaneous pneumothorax is commonly associated with tuberculosis. An idiopathic type is, however, recognized, and is apparently due to localized emphysematous blebs. This latter form tends to run a favorable course, going on to spontaneous recovery in a few weeks. The causative emphysematous blebs may be the result of indurative processes in the subpleural tissue, or of emphysematous processes in the proximity of adhesions. —*Spontaneous Pneumothorax, F. J. Hirschboeck, Ann. Int. Med., January, 1931, iv, 705.*—(*R. D.*)

Nontuberculous Spontaneous Pneumothorax.—The literature is reviewed and 3 cases from the author's experience are reported in detail. Illustrative roentgenograms are reproduced. Asthma was the causative agent in the one fatal case. Recovery was complete in the other two cases. No cause was found in one of them; in the other, physical exertion was apparently the cause. Pneumothorax is always secondary to a lesion of the lung or of the pleura. The symptomatology, physical signs and treatment of spontaneous pneumothorax are discussed. The impression gained is that idiopathic spontaneous pneumothorax is of much more frequent occurrence than is generally recognized, and that spontaneous pneumothorax is not necessarily secondary to tuberculous infection.—*Non-Tuberculous Spontaneous Pneumothorax, R. L. Fisher, Ann. Int. Med., May, 1931, iv, 1395—.* (*R. M. F.*)

Treatment of Spontaneous Pneumothorax.—After the diagnosis of spontaneous pneumothorax is established the patient should be put at complete bed-rest and should be given such symptomatic treatment as may be indicated by the condition of his respiratory and circulatory systems. If the condition becomes worse under conservative treatment air should be removed from the pneumothorax cavity. This should be done with the pneumothorax apparatus, and the pressure should be constantly watched. A sufficient amount of air should be withdrawn to relieve the symptoms. If possible, the pressure should remain on the positive side, because this facilitates healing of the pleural tear. If the pressure becomes constant during a certain period of observation near zero the likelihood is that an open pneumothorax exists. If the pressure increases considerably above zero a valvular pneumothorax exists. The injection of 20 cc. of a 10-30 per cent glucose solution helps to heal the pleural tear. In cases of valvular pneumothorax constant drainage is more advisable than the occasional removal of larger quantities of air. A simple apparatus is described by which permanent drainage can be achieved, keeping the intrathoracic

pressure always at the same level.—*Drainage bei Ventilpneumothorax, A. Kenner, Wien. klin. Wchnschr., May 8, 1931, xliv, 605.*—(*M. P.*)

Massive Collapse of Lung.—The history and course of a case of peripheral neuritis with paralysis is reported. The interesting features of the case were the clearing up of the paralysis following the removal of focal infection and the occurrence of massive collapse of the lung following tonsillectomy.—*Peripheral Neuritis Complicated by Massive Collapse of the Lung Following Tonsillectomy, H. V. Dwyer, Arch. Int. Med., November, 1930, xlvi, 833.*—(*W. I. W.*)

Massive Collapse of Lung.—A case is reported of acute massive collapse of the lung following lipiodol injection. Collapse was immediate and there was complete recovery within twelve hours. The four main theories of aetiology are given as follows: (1) failure of the respiratory power of the lung playing an active part; (2) the mucus-plug theory; (3) reflex spasm of muscles of the bronchioles; and (4) inflammation of the crus and one-half of the diaphragm or of pleural membrane covering it. In cases of immediate collapse, it is probably the inhibition of the cough reflex and the impairment of the respiratory muscles which produce a reflex spasm of the bronchi and bronchioles, thus actively expelling the air from the bronchial system, while the mucus plug acts as a check valve, not allowing air to reënter.—*Acute Massive Collapse of the Lung Following Lipiodol Injection, A. J. S. Pinchin and H. V. Morlock, Brit. M. J., May 30, 1931, no. 3673, 930.*—(*M. E. P.*)

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